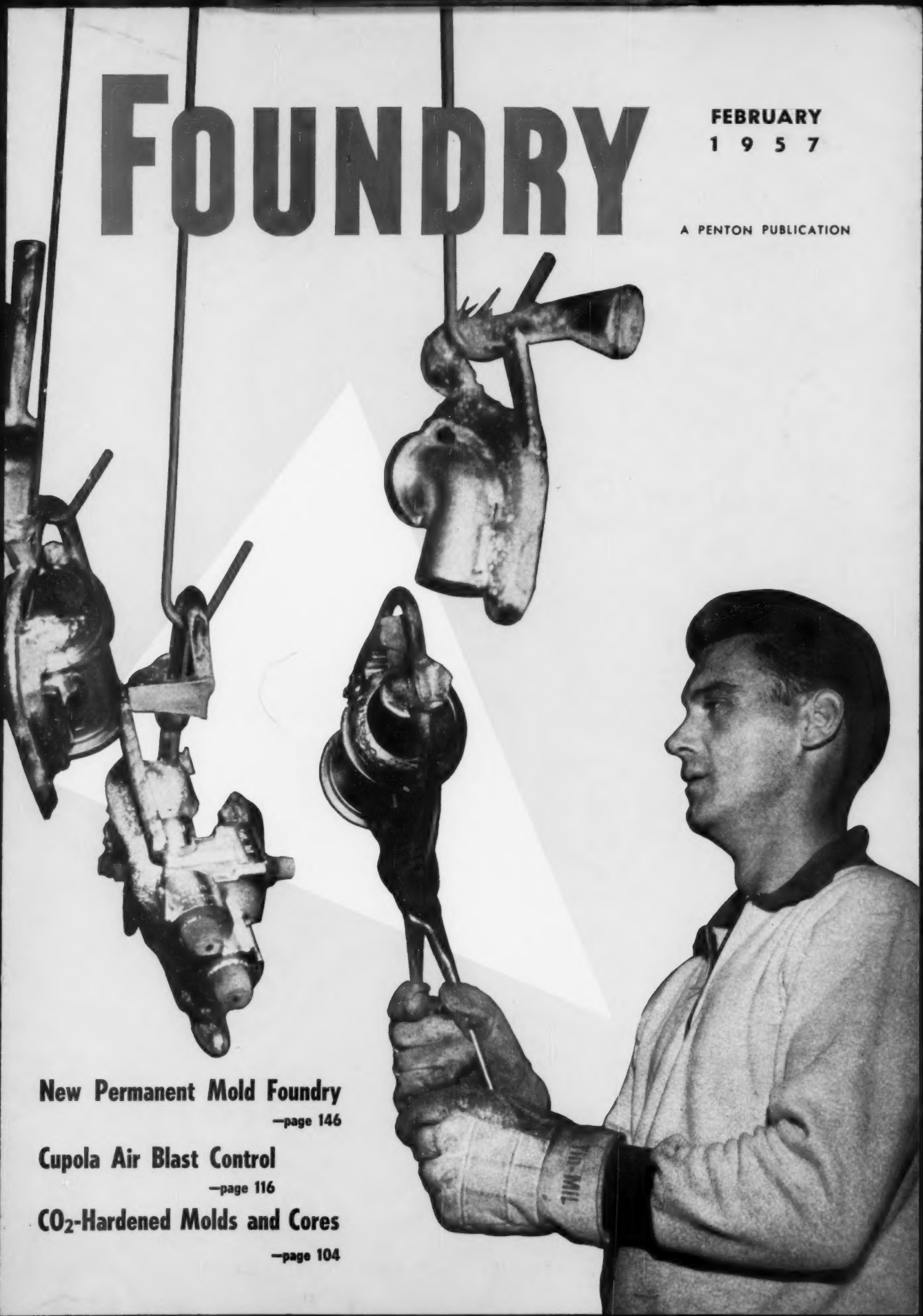
FOUNDRY

FEBRUARY
1 9 5 7

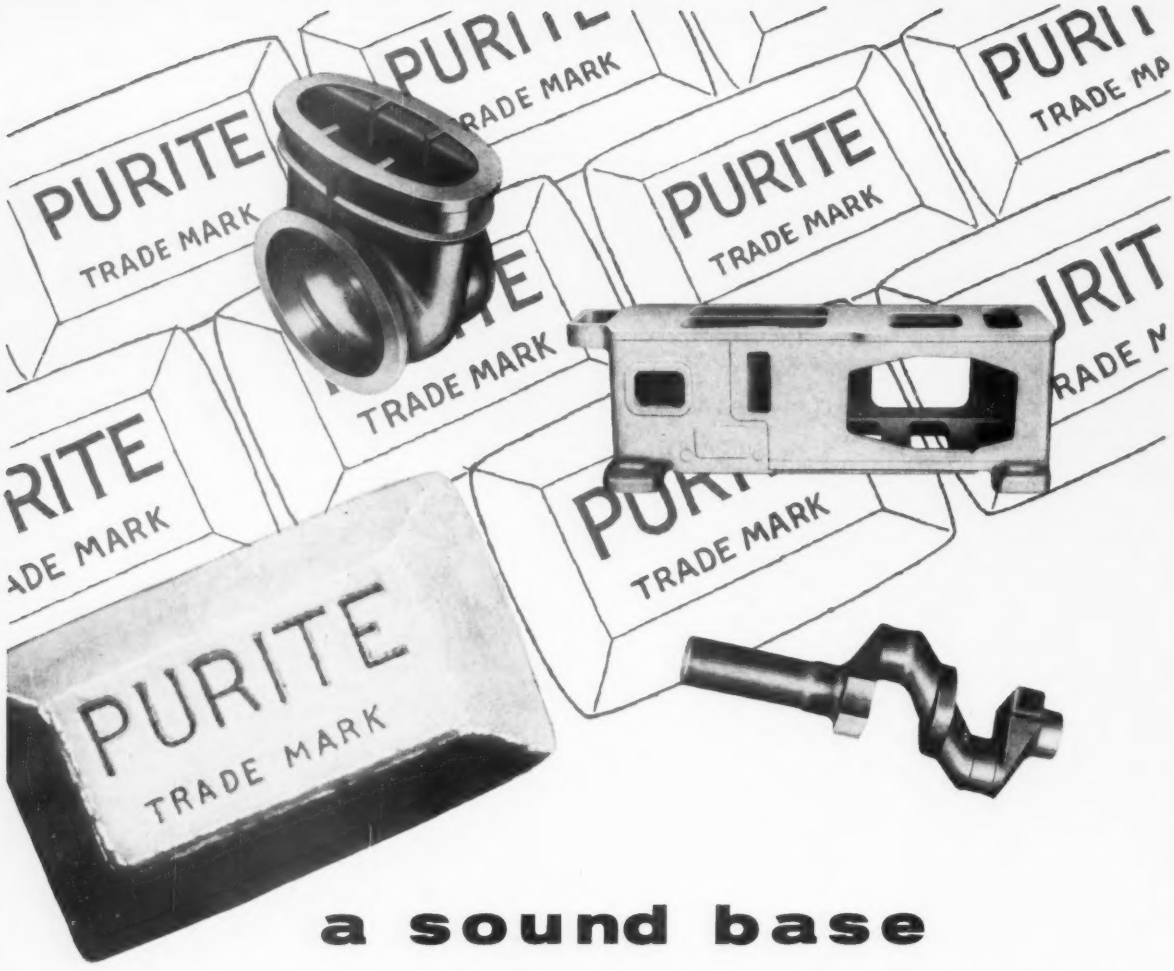
A PENTON PUBLICATION



New Permanent Mold Foundry
—page 146

Cupola Air Blast Control
—page 116

CO_2-Hardened Molds and Cores
—page 104



a sound base for quality castings

Assures smooth mixing and melting. Purite flux in the cupola increases fluidity of the charge, speeds combustion reactions, and prevents bridging.

Cures high-sulphur scrap. In both cupola and ladle, Purite is an efficient desulphurizer producing clean, quiet-pouring iron of the desired sulphur specification.

Convenient and economical. Each Purite pig is two pounds of pure, non-crumbling fused soda ash. No inert waste or dust; no expensive equipment. Easily stored; easily used . . . you measure the amount you need by counting.

Used for over 30 years. The convenient pigs of fused soda ash are a familiar sight everywhere. Purite is distributed by leading supply houses in the U.S.A. and Canada. For the name of the one nearest you, or for further information, write today.

PURITE® is a trademark

MATHIESON

PURITE

OLIN MATHIESON CHEMICAL CORPORATION

INDUSTRIAL CHEMICALS DIVISION • BALTIMORE 3, MARYLAND

4357

Circle 551 on Inquiry Card—Page 209

A remedy for bouncing bodies

...or how Chuck Wright cut down rejects from 15 to 2%

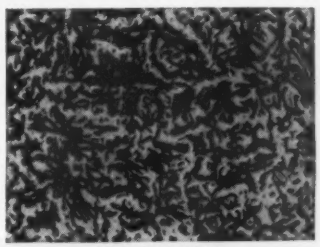
"'Chuck, look at these rejects. They been givin' me nightmares'."

"That's the way Hank Owens of Dexter Foundry put his trouble to me. Hank had a number of bodies bounce back from a maker of diaphragm control valves. The kind used in chemical and pulp and paper plants, 1½" to 3" sizes with pressure ratings of 125 to 250 psi.

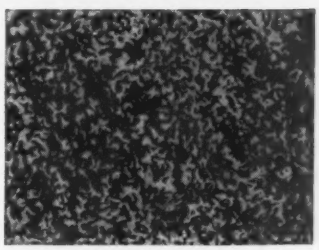
"Why so many rejects? Leakers and machining troubles. Leakers chiefly, found on pressure test after costly machining was complete. What Hank couldn't find out was the cause.

"Fortunately, I'd run into this situation in the past. We checked out gating, risering and sand conditions, they were perfect. So were cores. The gray iron met ASTM A-126-42, Class B specs, calling for a tensile of 31,000 psi. It was tapped hot enough to meet the desired pouring temperature, right on the nose.

"Yet when the customer's hydrostatic test gave these castings three times their rated pressures, the rejects ran about 15%. The only possibility left was that coarse grain was causing the trouble.



NO NICKEL



0.73% NICKEL

"So, showing Hank these two pictures, I explained how he could break up the large graphite flakes to get denser, uniform grain... and virtually eliminate leakage... by simple modification of his base chemistry particularly silicon content and addition of 1% nickel in the ladle.

"Today, Hank pours 1% nickel cast iron, and comfortably exceeds the customer's strength specification. What's more, he sliced his rejects on leakers to 2%. And the happy customer gets bodies that speed through his machining operation.

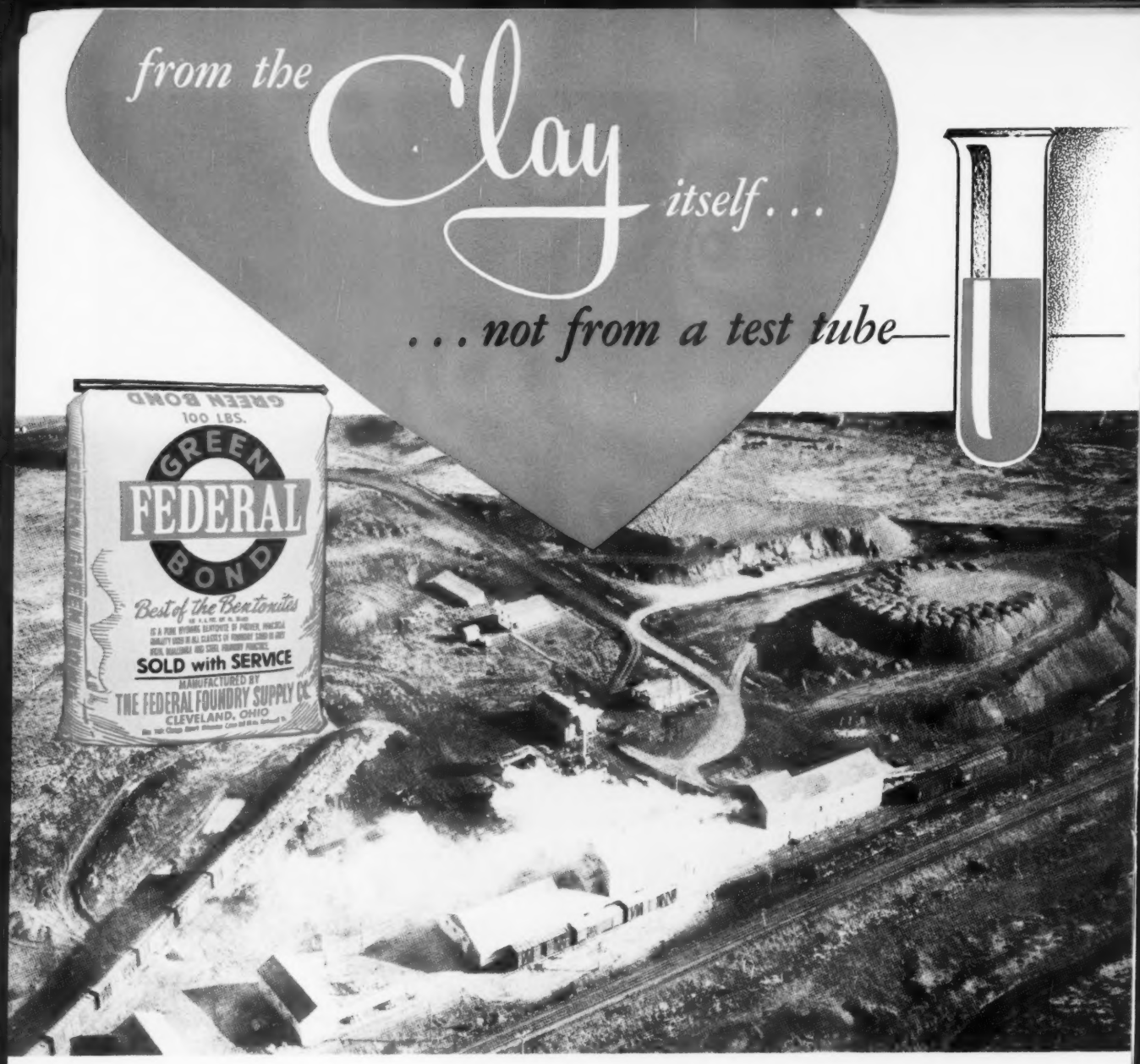
"When your problem involves the metallurgy of castings, let's put our heads together. Maybe I can help you, too. Easiest way to reach me is through INCO."

Chuck Wright

INCO TRADE MARK

The International Nickel Company, Inc.

67 Wall Street New York 5, N. Y.



that's where Federal **GREEN BOND** *gets its* **low viscosity!**

You'll get no "test tube" bentonite in GREEN BOND bags, because Federal doesn't resort to "alchemy" in producing its low viscosity bentonite. It doesn't have to — for low viscosity is a *natural* characteristic of the bentonite clay from which Federal GREEN BOND is processed. It's in the clay to start with — doesn't have to be concocted by adding certain chemicals.

If you'd like to fully appropriate the advantages of low viscosity, you'd best avoid "test tube" bentonites! For the very chemicals that might be added to bentonite, to lower its natural viscosity, *also lower the durability* of bentonite, causing it to burn out faster and quickly lose its ability to develop green and dry bond strength.

Whether you use bentonite "dry" or in "slurry", it will pay you well to use the *only bentonite with natural low viscosity* — Federal GREEN BOND — the best of the bentonites. Literature is available, telling all about Federal GREEN BOND and how to use it to improve the quality of your castings.

The FEDERAL FOUNDRY SUPPLY Company

4600 EAST 71st STREET, CLEVELAND 5, OHIO

19 CONVENIENT SOURCES FOR IMMEDIATE DELIVERY

FEDERAL WAREHOUSES—Chicago, Cleveland, Cranston, R. I., Crown Hill, W. Va., Detroit, Los Angeles, Milwaukee, Minneapolis, New York, Richmond, Syracuse, Upton, Wyo.

DEALER STOCKS—Birmingham, Chattanooga, Jacksonville, Oakland, Portland, Ore., Seattle, St. Louis

ALSO AVAILABLE THROUGHOUT CONTINENTAL EUROPE

Circle 555 on Inquiry Card—Page 209

FOUNDRY
A PENTON PUBLICATION

February 1957
Volume 85—Number 2

Editorial 103

SPECIAL ARTICLES

Making Ship Propellers with CO_2 Cores and Molds 104
Extensive experience with the CO_2 process has brought many economies and advantages to Columbian Bronze Corp.—By ROBERT H. HERRMANN

How To Pour a Mold 110
Recommendations that every foundryman can follow to insure the smooth functioning of pouring operations—By MORRIS GITTLEMAN

The Brass Foundry 112
Nineteenth article in series discusses centrifugal, investment and metal mold casting, organic binders and shell molding—By HARRY ST. JOHN

Air Blast Control Improves Cupola Operation 116
Cupola operation is improved considerably by installation of an automatic, continuous air blast control system—By E. J. PARKER

Seek International Gray Iron Specifications 120
Report on a proposal that seeks approval of international specifications of properties of gray iron test bars—By H. W. LOWNIE JR.

Closures for Coreboxes 123
Descriptions of various corebox closures and their applications in practice to aid the patternmaker—By W. HAGEDORN

Casting Design—A Teaching Method 128
Here's how some college students decide what casting process to use and how to design a part for it—By L. B. ZYLSTRANG and W. A. SNYDER

OTHER FEATURES

Conveyor Speeds Permanent Mold Inspection By JAMES JOSEPH 146
AFS Nominates Officers and Directors 150
New Safety Code on Abrasive Wheels 158
Man-to-Man By RALPH L. LEE 161
How To Prolong Conveyor Belting Life By JOSEPH E. HOLLAND 166
Specializes in Investment Ferrous Castings By T. A. DICKINSON 182
Electric Furnace Conference By EDWIN BREMER 190
Meditations of a Sandman By HAROLD E. HENDERSON 200
Trouble Shooting By C. W. AMMEN 206
Things To Remember When Ordering New Parts By ERNEST W. FAIR 230
Epoxy Resin Is Versatile Foundry Tool By ROBERT E. WILLIAMS 232
Program for Training Lift Truck Drivers By ROBERT G. DYMENT 236
Fire Protection Problems By BYRON J. O'HARA 242

NEWS FEATURES

Around the Country 177
Calendar of Meetings 14
Foundry Group Meetings 248
Industry Briefs 155
Late News 33
Men of Industry 134
News Views 188
Obituary 170

REGULAR DEPARTMENTS

Classified Advertising 261
Foundry Developments 174
Helpful Foundry Literature 209
How To Do It 156
New Equipment and Supplies 214
Questions and Answers 130
Reader's Comment 98
The Shakeout 252
Statistics 197
With the Editors 10

Business Staff—page 273
Advertisers' Index—page 273

EDITORIAL STAFF

FRANK G. STEINEBACH
Editor

WILLIAM G. GUDE
Managing Editor

EDWIN BREMER
Metallurgical Editor

ROBERT H. HERRMANN
Associate Editor

JACK C. MISKE
Associate Editor

KENNETH L. MOUNTAIN
Associate Editor

VIRGINIA C. TAYLOR
Assistant Editor

VIRGINIA B. HARMS
Assistant Editor

DON S. CADOT
Art Editor

New York ..... B. K. PRICE
L. E. BROWNE
Detroit ..... A. D. POSTMA
Pittsburgh ..... ROBERT M. LOVE
Chicago ..... ERLE F. ROSS
Washington JAMES P. MORRISSEY
London ..... VINCENT DELPORT

MAIN OFFICE
Penton Building
Cleveland 13, Ohio
Main 1-8260

(For addresses of branch offices, see page 273)

READERSHIP Partners RESEARCH

Published monthly by the Penton Publishing Co., Penton Building, Cleveland 13, O. Subscriptions in the United States, possessions and Canada, one year, $5. Single copies, $1. Other countries, one year, $20. Single copies, $2. Second class mail privileges authorized at Cleveland, O.
Copyright, 1957, by the Penton Publishing Co.

ARCHER
ADMIREZ
FOUNDRY
RESIN
ARCHER
LINOIL
CORE
OIL

ARCHER
QUALITY
FOUNDRY
PRODUCTS

YOUR CLUE

where sand is a problem

Where sand presents a problem (or offers an opportunity) to produce better castings at lower cost, it is no longer necessary to search out and track down special binders—for special processes—at special prices.

The clue to a quick solution is the familiar ARCHER. Whether you are producing conventional cores, hollow cores, or shell molds; whether you cure cores at room temperature, in ovens, or with CO_2; ADM, once famous in foundries only for its LINOIL, now offers a binder for *every process, every type core, every kind of sand.*

There's no need to search further. Reach for your phone . . . call your ARCHER man . . . there's representation in every important foundry area.

Archer • Daniels • Midland company

FOUNDRY PRODUCTS DIVISION ▪ 2191 WEST 110th STREET, CLEVELAND 2, OHIO

Circle 556 on Inquiry Card—Page 209

ARCHER **INDUCTOL** FAST-BAKING CORE OIL

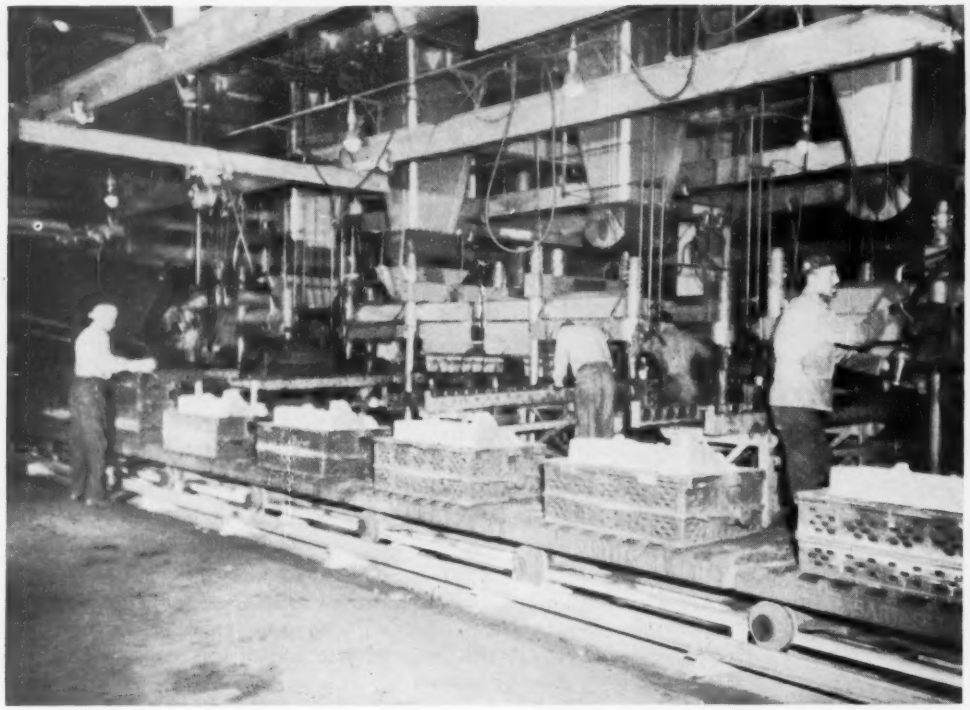
ARCHER **FRE-FLO** PARTING COMPOUND

ARCHER **LIN-O-CEL** SAND STABILIZER

ARCHER **LIN-O-SET** AIR-SETTING BINDER

ARCHER **ADCOSIL** CO_2 CORE BINDER

For Half a Century MANUFACTURERS HAVE DEPENDED ON NICHOLLS for the Best in Molding Equipment!



A battery of NICHOLLS "push-button" automatic molding machines in a large foundry.

The Heavy Duty Molding Machines That Have Everything!

- ***"Push-button" automatic control to eliminate dangerous risks.***
- ***Precision-built for years of service.***
- ***Quality construction for finer molds continuously.***
- ***Fully automatic operation.***
- ***Greater molding economy than you've ever known.***

There must be a reason why so many of the country's top manufacturers choose Nicholls equipment. And there is. It's the same reason why *you* will want to specify Nicholls Jolt-Squeeze and Pattern Draw Molding Machines—Ease and economy of operation, low maintenance costs—and the best possible molds every time.

For complete information, write:
Wm. H. Nicholls Co., Inc., Richmond Hill 18, Long Island, New York.

NICHOLLS

B.F.Goodrich report:

Hurricane of sand roars through hose

B. F. Goodrich improvements in rubber brought extra savings

Problem: To clean rough spots off metal, the workman is using a blast of sand that roars out of a hose nozzle at terrific speed. Efficient for cleaning, but the hurricane of sand was wearing holes through every kind of hose tried on this job.

What was done: When a B.F.Goodrich man heard about the trouble, he recommended a hose, specially developed by B.F.Goodrich to stand this rough treatment. Extra-soft rubber is used for the lining of this sand blast hose, so the sharp, destructive sand simply bounces off the rubber instead of digging in and cutting it to shreds.

Savings: The B.F.Goodrich hose has been on this job 3 years now—longer than any hose used before—and it shows no sign of wearing out.

Extra benefits: It is much lighter than sand blast hose used to be, more flexible, easier for workmen to handle. And there's no danger of workmen being shocked or jolted by static electricity, generated by sand rushing through the hose. Antistatic rubber carries away electric charges as fast as they build up.

Where to buy: Your B.F.Goodrich distributor has exact specifications for the B.F.Goodrich hose used in this sand-blasting job. And, as a factory-trained specialist in rubber products, he *can* answer your questions about *all* the rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-861, Akron 18, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

Circle 558 on Inquiry Card—Page 209

44 ALUNDUM* abrasive

. . . a revolutionary Norton development for new "TOUCH of GOLD" economy in foundry snagging

You Can SEE The Difference! The new Norton 44 ALUNDUM abrasive (at right) differs definitely in appearance from ordinary aluminum oxide abrasive. The finer grain structure of "44" indicates its much denser, tougher composition. And the money-saving performance of this modern new abrasive is just as easy to spot — every time 44 ALUNDUM wheels go to work for you.

In new 44 ALUNDUM abrasive Norton brings you a combination of grinding quality, versatility and economy never before equalled in a non-premium abrasive.

We want to emphasize that point. Although the new "44" is non-premium priced, right there its resemblance to any ordinary aluminum oxide abrasive ends abruptly. It is definitely different and better in every way.

"44" is made differently, by a special, Norton-developed electric furnace process that results in extreme toughness and ruggedness.

"44" performs differently. Compared to ordinary aluminum oxide abrasive wheels, the new 44 ALUNDUM wheels cut faster, grind cooler and last longer. They do more work per wheel. When snagging, these "Touch of Gold" advantages mean improved product quality, higher production rate and lower cleaning room costs.

"44" is job-proved. Over 1100 different tests were made on the new 44 ALUNDUM wheels, in plants of all kinds throughout the country. Here are some typical reports from foundries:

- ***"Wheel life doubled over previous standard wheels. Operators very pleased with rate of cut."***
- ***"80% longer wheel life and much faster cut."***
- ***"Faster cutting, better finish, much less depth of burn."***

Adding Up

"44" is a real work-horse abrasive that delivers thoroughbred performance. On any job for which you're now using non-premium priced aluminum oxide wheels, the new 44 ALUNDUM wheels will grind off more metal per dollar — faster, easier and better.

Your Norton Distributor will be glad to prove this to you. See him about arranging test runs of new 44 ALUNDUM wheels in your plant. Or write to the nearest district office of NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone book, yellow pages. Behr-Manning Company, Troy, N. Y., division of Norton Company. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

ON YOUR SWING FRAME GRINDERS new 44 ALUNDUM wheels add the "Touch of Gold" that speeds up snagging operations, reduces operator-fatigue and cuts costs. Made with the well known Norton B11 resinoid bond, they'll take the heaviest pressures and highest speeds — with fast, cool cutting action and extra long wheel life never before matched in non-premium priced wheel performance.

ON YOUR FLOOR STANDS you'll grind off more metal per wheel and per man-hour with new 44 ALUNDUM wheels. New "44" is the toughest, most efficient abrasive you can use for snagging.

ON YOUR PORTABLES new 44 ALUNDUM wheels "hug that work" closer, with least vibration and bounce. And "44" mounted wheels bring the same new, cost-cutting advantages to those hard-to-reach spots.

W-1741

NORTON
ABRASIVES

Making better products...
to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories

BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Behr-cat Tapes

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

60 TONS

of hot castings daily

Every 16-hour day, 60 tons of castings with temperatures to 250° F. ride this Imperial Belt. The belt is Imperial* Standard Rexall—Impregnation 615 (117′ x 30″ x 5 ply)—a brand developed for the rugged requirements of this abrasive foundry service.

Long service life—Installed in 1953, this belt has been in continuous operation at the Chambers, Bering, Quinlan Co., a jobbing foundry. The characteristics that contribute to such long belt life include:

Super-strong construction . . . heavy-duty hard silver duck fabric.

Exclusive Imperial impregnation . . . waterproofs, lubricates, toughens and preserves every fiber.

Double stitching . . . permanently prevents ply separation.

Lowest year-to-year cost—Other Imperial INNERLOCKED* Belts are job-designed to withstand temperatures as high as 600° F. Their low operating cost has been proved over the last 45 years. ***Write for our new conveyor and elevator belting catalog and engineering handbook.***

*Reg. trademark of Imperial Belting Co.

Imperial
BELTING COMPANY
1755 S. Kilbourn Ave., Chicago 23, Illinois
You expect MORE from Imperial . . . and you get MORE!

Circle 560 on Inquiry Card—Page 209

With the Editors

WEST COAST SHOW PLACE: One of the show places of the foundry industry on the West Coast is the new plant of General Metals Corp. at Oakland. Visitors to the Bay Area are always impressed with the layout and operation of this large foundry producing such a wide variety of castings.

This $5 million foundry, which is attached to the large steel foundry built by that company during World War II, produces gray iron castings ranging from a few ounces to 16 tons. The plant is well laid out, highly mechanized, and at the same time provides a high degree of flexibility.

Since all of us are not fortunate enough to visit San Francisco and the Bay Area, FOUNDRY has arranged to bring the story of this foundry to its readers. An extensive article dealing with the physical layout, operation, and problems facing a jobbing foundry in that section of the country will be presented in the March issue. This treat for our readers is made possible through the fine co-operation of the management and operating personnel of General Metals.

Watch for this article!

—o—

Sell More Castings: After many planning sessions, the editors have decided that the theme of our special presentation in the May, Pre-Convention issue will be "Foundries Can Sell More Castings." A series of five articles will deal with various factors of the sales problem, as follows: Potentials of the Market for Castings; How Improved Technology Can Aid Castings Sales; How Research and Product Development Can Sell Castings; How New Methods and Materials Helped One Foundry To Sell Castings; How a Foundry Can Build a Marketing Program.

Preparation of this material is under way. Editors are consulting with experts in the various phases of production and sales activity to be discussed so that this special feature will be most authoritative and valuable to FOUNDRY readers.

—o—

Sand or Bull? The other day I had a letter from Bill Walkins, editor, *The ESCO Ladle* of Electric Steel Foundry Co., Portland, which reads: "Probably two of the biggest sand and bull slingers in the foundry business got together in early December when Harold Henderson of Macaulay Foundry Co., Berkeley, Calif., visited us at ESCO-Portland. Harold and I have known each other for a long time, as members of a mutual admiration society, but had not met."

Well, Bill, while I am not an expert in either field, I am sorry to have missed the session. It must have been fun.

Bill Hughes of ESCO's sand laboratory took a couple of photographs of the affair which I am including on this page. The single-column job shows Harold (left) and

Sounder, cleaner metal...

Lower scrap loss...

Reduced labor...

with HARBISON-WALKER REFRACTORY GATE and RUNNER TILE

CLEANER METAL

Harbison-Walker Gate and Runner Tile are strong and withstand rapid metal flow without excessive erosion. Cleaner metal is the result.

LESS SCRAP LOSS

Tile of minimum diameters may be used, with considerable reduction of metal in gates, and consequent savings in scrap loss.

REDUCED GAS INCLUSIONS

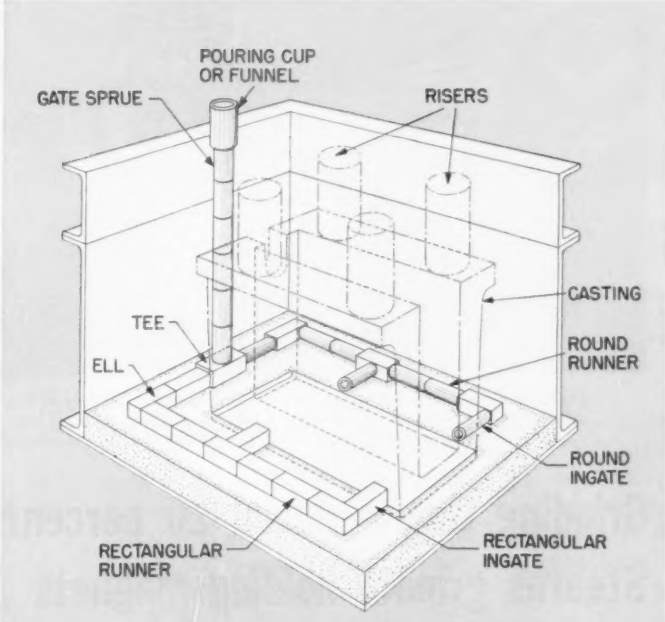
Refractory tile are much stronger than sand, permitting pouring under high pressure. This practice reduces gas inclusions.

EASIER TO USE

Installation in the mold is easier and faster, and overall cost is less.

TIGHT JOINTS ASSURED

The excellent workmanship of Harbison-Walker Gate and Runner Tile accounts for their good tight fit.



ALL SIZES AND SHAPES NEEDED FOR COMPLETE GATING SYSTEMS

The drawing above shows a model arrangement illustrating how various shapes are used. The casting is shown in phantom.

Harbison-Walker tile are supplied in approximately 200 sizes and shapes. These include cups or funnels, round and square tile with plain or jointed ends, crosses, tees and ells. Many of the more popular sizes are available from stock.

Write for catalog of sizes from which to select those best adapted for your needs.

HARBISON-WALKER REFRACTORIES CO.

AND SUBSIDIARIES

World's Most Complete Refractories Service

***GENERAL OFFICES:* PITTSBURGH 22, PENNSYLVANIA**

Circle 561 on Inquiry Card—Page 209

Stearns Grinder Holding Magnet holds this casting firmly in upright position during grinding... reduces grinding time and hand finishing ...saves wear on grinding wheels by eliminating movement of casting.

Grinding time reduced 20 percent with Stearns grinder holding magnets

Production records of a midwest foundry show that by using Stearns Grinder Holding Magnets operators reduced grinding time by 20 percent on average castings, 15 percent in grinding risers from flat-surface castings and an additional 15 percent in positioning odd-shaped castings. Other users have reduced grinding costs by as much as 30 percent after installing Stearns magnets.

Holding all shapes of castings firmly in place, these powerful magnets permit operators to apply equal pressure at all times. No need for blocks, clamps, wedges or dangerous makeshift holders. Tilting models let you operate at angles up to 30 degrees in each direction. They lock securely at any point.

Ruggedly built for tough foundry duty, inexpensive to operate and maintain, Stearns Grinder Holding Magnets can help you cut grinding costs. Three sizes — 16 x 14 in., 16 x 24 in., 16 x 40 in. Small magnet excellent for single pieces, larger sizes for multiple units. Available with either hand or foot switch.

Modernize your grinding operations. Get the full story from your Stearns representative or write us for Bulletin 138-C-G.

STEARNS MAGNETIC PRODUCTS

A DIVISION OF THE INDIANA STEEL PRODUCTS COMPANY • VALPARAISO, INDIANA

635 South 28th Street • Milwaukee 46, Wisconsin

Bill really comparing notes. The larger illustration at the bottom of page 10 reads from left to right: Bill Walkins; Harold Henderson; Charles Schureman, sand consultant; Eddie Quigg and Sam Peeler, ESCO; Charles Marshall, Industrial & Foundry Supply Co., San Francisco; Kurt Miericke, National Lead Co., Baroid Division, Chicago; Dick Stanley and Tom Belusko, ESCO.

—o—

Want an Index? Do you want an index of all the articles which appeared in FOUNDRY during 1956? To the many who save back issues of this publication, the index should prove a great time saver.

A 16-page listing and cross reference index of these articles has been prepared and will be sent gratis to any reader making a request to the Readers' Service Department, FOUNDRY, Penton Bldg., Cleveland 13, O.

—o—

Need A Special Week?: If you want to get a good laugh, glance through a copy of "Special Days, Weeks and Months, 1957," published by the Chamber of Commerce of the United States. I suppose all of these "special weeks" provide good promotion for the marketing of consumer goods, but some do seem a little silly. For example, I do not think I could get too excited over Bow Tie Week; Can Opener Week; Visit Your Dealer Week; Hot Dog Month; Do-It-Yourself Week (I hate work); Pass the Laugh Week; Rabbit Week; Rock 'n Roll Week; Save the Horse Week; Smile Week.

I found one that strikes a responsive chord. It's Let's Go Fishing Week. But why limit it to a single week? Let's do it all summer.

—o—

Congratulations: Following the comments in January on the retirement of my father, I received a very fine letter from I. Glueck, secretary, Brass & Bronze Ingot Institute, Chicago. His letter contained one paragraph that I would like to pass along. Pointing out that Dad had earned a rest after 87 years so filled with hard work and worthwhile contributions to our youth, Mr. Glueck said, "I know whereof I speak as I have just completed 76 years, and the most satisfaction comes from the rewarding years I spent in Big Brother work and the training and guiding of hundreds of young men in my long business career. I meet them constantly and their success has repaid the time and effort devoted to them."

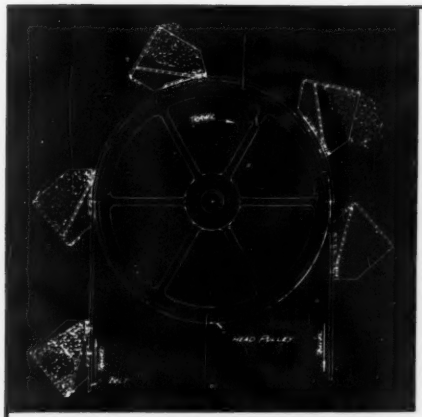
Thanks so much, Mr. Glueck, for your very fine letter, and congratulations on your fine record of service to our youth. F.G.S.

Circle 562 on Inquiry Card—Page 209

Circle 563 on Inquiry Card→

HIGH SPEED–LOWER MAINTENANCE–BETTER SAND CONTROL

with PEKAY AIRATOR



★ LOADS CAN'T STICK—EMPTIES EVERY TIME! ★

the patented

PEKAY M-T-MATIC ELEVATOR CONVEYOR BUCKET

Irresistible leverage from separately mounted stripper-plate forces load free, even if frozen or hard-packed—bucket empties completely on *every* trip, without banging or battering! That means you handle more material at the same or higher belt speeds—stop damage to buckets—cut belt replacements, too. Easy to install on any elevator conveyor—available for quick delivery in all standard sizes, at attractive prices.

Write today for low prices, complete data!

You can produce 300 tons per hour or more—with your belt running at 150 feet per minute—of thoroughly aerated, fluffed, lump-free sand, with the PEKAY AIRATOR! Foundries all over the country are getting just that kind of production, day in and day out, as the AIRATOR answers sand conditioning problems in more and more installations.

This steady efficiency is but one of the advantages the AIRATOR offers you. Expertly designed and ruggedly constructed, you'll get exceptionally long life with this equipment, and much less frequent replacement of wearing parts. Even when occasional servicing is necessary, you save valuable time because the AIRATOR sideplates permit easy inspection, easy access to all moving parts. Your operating costs go down as your production and quality go up!

Get all the facts about this compact, easy-to-install equipment—putting it to work in *your* plant takes amazingly few man-hours, requires no major changes in your belt system. There's a PEKAY representative in your section to give you full details.

SEND FOR COMPLETE INFORMATION

Specialists in Foundry Sand-Handling Engineering & Equipment

PEKAY MACHINE & ENGINEERING CO. INC.

871 N. SANGAMON STREET CHICAGO 22, ILLINOIS

M-T-MATIC Elevator Conveyor Buckets
TROFF-O-MATIC Conveyors

Gentlemen: Please send me details and price information on

☐ PEKAY AIRATOR
☐ PEKAY M-T-MATIC ELEVATOR BUCKETS

(NAME) _____

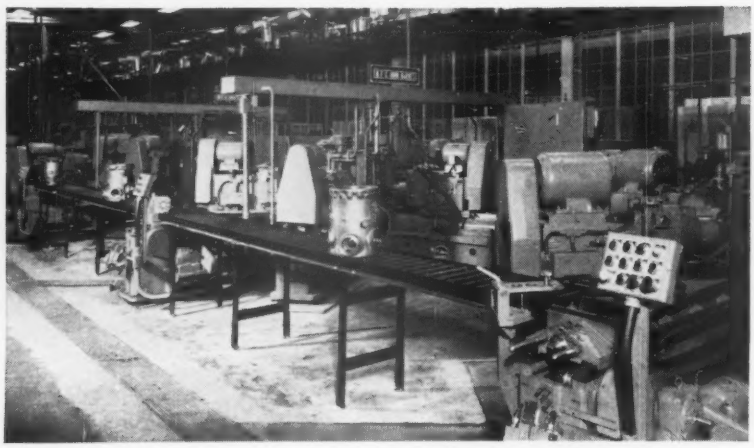
(COMPANY) _____

(ST. & NO.) _____

(CITY) _____ (ZONE) ____ (STATE) _____

Ask Standard

how to cut costs with conveyors



Standard gravity roller conveyors like this are modest in cost, easy to install and maintain.

Conveyor system helps Airtemp up compressor parts production 40%

To handle stepped-up demands for residential and industrial air conditioners, the Airtemp Division of the Chrysler Corporation undertook an extensive re-tooling program. On one compressor crankcase line, for example, they installed 17 new machine tools . . . connected them all with Standard gravity roller conveyors. Result — two hours saving per case, production up 40%.

If you're planning on modernizing or retooling it will pay you, too, to find out how Standard conveyors can complement new equipment . . . give you lower overall costs and greater productive efficiency. STANDARD CONVEYOR COMPANY, North St. Paul 9, Minnesota. Sales and Service in Principal cities.

To expedite shipping or stocking and reduce handling costs, investigate Standard lightweight portable roller conveyors (right) or the portable, self-powered HANDIBELT conveyor (left), which can be used horizontally or at varying incline or decline angles.

For details — contact the Standard representative listed in the classified phone book or write direct. Ask for Bulletin N-2.

Standard 50 years of conveyor experience

GRAVITY & POWER CONVEYORS

CALENDAR of Meetings

Feb. 4-8—American Society for Testing Materials, committee week and spring meeting, Benjamin Franklin Hotel, Philadelphia.

Feb. 7-8—Malleable Founders' Society, 2nd technical and operating conference, Wade Park Manor, Cleveland.

Feb. 14-15—Wisconsin Regional Foundry Conference, Hotel Schroeder, Milwaukee.

Feb. 21-22—Southeastern Regional Conference, sponsored by Birmingham and Tennessee chapters, AFS, Dinkler-Tutwiler Hotel, Birmingham.

Mar. 13-14—Foundry Educational Foundation, college-industry conference, Hotel Cleveland, Cleveland.

Mar. 15-16—California Regional Conference, Claremont Hotel, Berkeley.

Mar. 18-19—Steel Founders' Society of America, annual meeting, Drake Hotel, Chicago.

Mar. 25-29—American Society for Metals, Western Metals Congress and Exposition, Ambassador Hotel and Pan-Pacific Auditorium, Los Angeles.

Apr. 10-11—Malleable Founders' Society, market development conference, Edgewater Beach Hotel, Chicago.

Apr. 12-13—East Coast Regional Conference, sponsored by Metropolitan, Chesapeake and Philadelphia chapters, AFS, Benjamin Franklin Hotel, Philadelphia.

Apr. 29-May 3—Seventh National Materials Handling Exposition, Convention Hall, Philadelphia.

May 6-10—American Foundrymen's Society, 61st annual convention and castings exhibit, Cincinnati.

May 20-23—Design Engineering Show, Coliseum, New York City.

June 10-11—Magnesium Association, summer meeting, Homestead, Hot Springs, Va.

June 13-14—Malleable Founders' Society, annual meeting, Broadmoor, Colorado Springs, Colo.

June 16-21—American Society for Testing Materials, annual meeting, Chalfonte-Haddon Hall, Atlantic City, N.J.

June 20-21—American Foundrymen's Society, 2nd annual foundry instructors' seminar, Kellogg Center, Michigan State University, East Lansing, Mich.

June 20-22—Penn State Foundry Conference, sponsored by Pennsylvania State University in co-operation with AFS chapters in New York and Pennsylvania and several independent foundry groups, Pennsylvania State University, University Park, Pa.

June 23-25—Alloy Casting Institute, annual meeting, Homestead, Hot Springs, Va.

June 27-28—Refractories Institute, annual meeting, Greenbrier, White Sulphur Springs, W. Va.

Sept. 17-20—American Die Casting Institute, annual meeting, Edgewater Beach Hotel, Chicago.

Sept. 23-24—Steel Founders' Society of America, fall meeting, Homestead, Hot Springs, Va.

Sept. 26-28—Missouri Valley Regional Conference, sponsored by St. Louis, Tri-State, and Mo-Kan chapters, AFS, and Missouri School of Mines Student Chapter, Missouri School of Mines and Metallurgy, Rolla, Mo.

Oct. 9-11—Gray Iron Founders' Society, annual meeting, Drake Hotel, Chicago.

Oct. 12-15—Conveyor Equipment Manufacturers Association, annual meeting, Grand Hotel, Point Clear, Ala.

Oct. 17-18—Magnesium Association, annual convention, Biltmore Hotel, New York.

Oct. 17-18—Foundry Equipment Manufacturers Association, annual meeting, Greenbrier, White Sulphur Springs, W. Va.

Oct. 21-25—National Safety Council, national safety congress and exposition, Conrad Hilton Hotel, Chicago.

Nov. 4-8—American Society for Metals, national metals exposition and congress, International Amphitheatre, Chicago.

Nov. 7-8—National Foundry Association, annual meeting, Waldorf-Astoria Hotel, New York.

Nov. 11-13—Steel Founders' Society of America, technical and operating conference, Hotel Carter, Cleveland.

Exclusive with the Heroult:

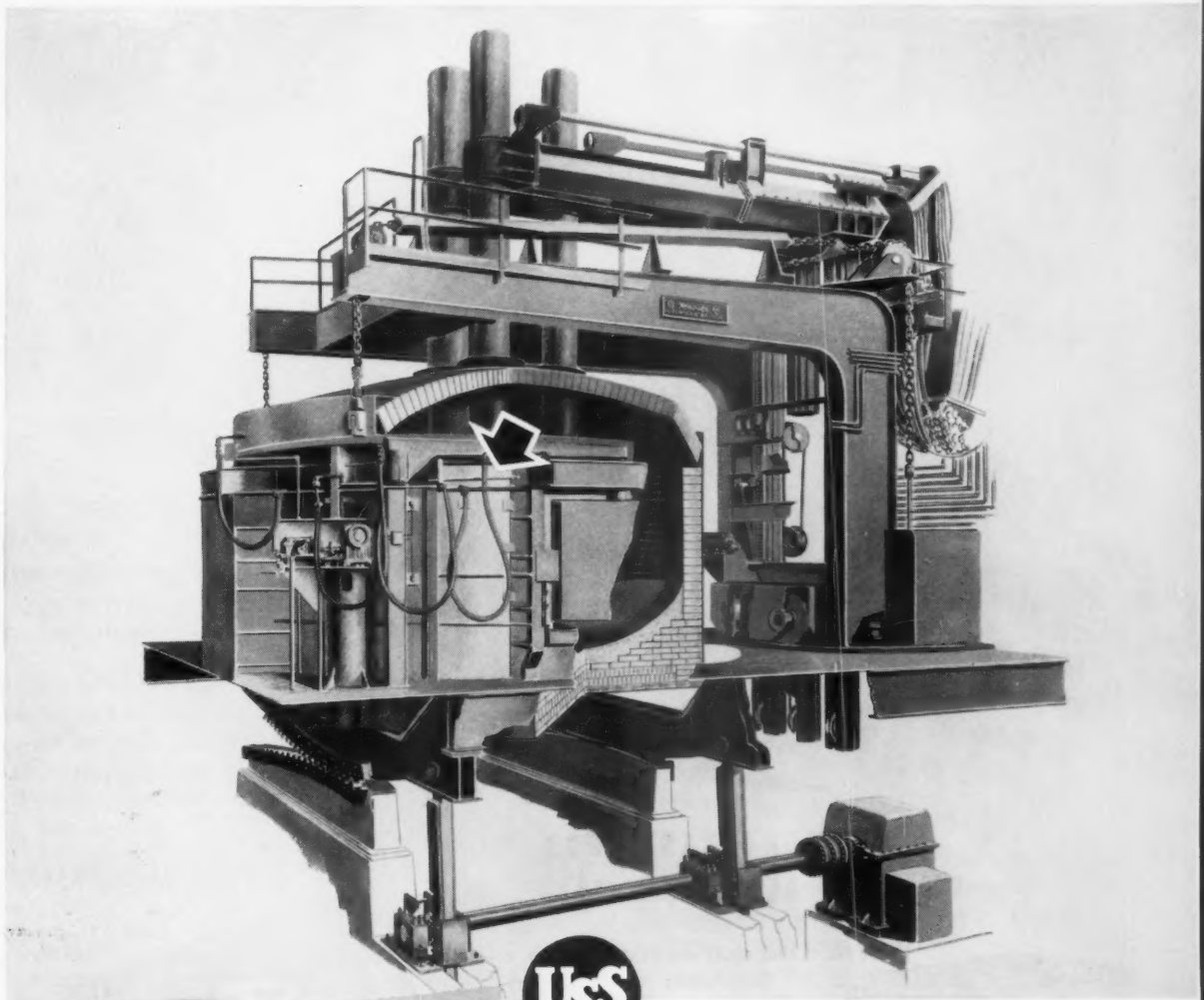
Cage-Type Shell Construction

The Heroult is the only electric furnace on the market with a cage-type shell. In this exclusive design, the shell plates are loosely attached to a heavy structural supporting cage, which allows the plates to expand and contract freely, thus minimizing shell distortion due to extreme changes in temperature. This type of construction also permits easy replacement of damaged shell plates.

This cage-type shell construction is just one of the many advantages you get in the Heroult—advantages which make for performance efficiency, operating economy, and low-cost maintenance. Other exclusive features are: 100% mechanical operation; independently supported operating mechanism; flat bottom shell; and skew back roof ring.

The new Heroult Electric Melting Furnaces are available in sizes of shell diameter ranging from 7′ 0″ up, and with capacities of from 6,000 lbs. up to 400 000 lbs. and greater. They can readily be furnished with a non-magnetic shell bottom section to accommodate induction-stirring equipment. Gantry-type top-charge furnaces, door-charge furnaces, and special furnaces for duplexing and non-ferrous melting can also be supplied.

We welcome an opportunity to help you select and install the Heroult best suited to your requirements. An inquiry to the nearest office will bring complete details.



USS TRADE MARK

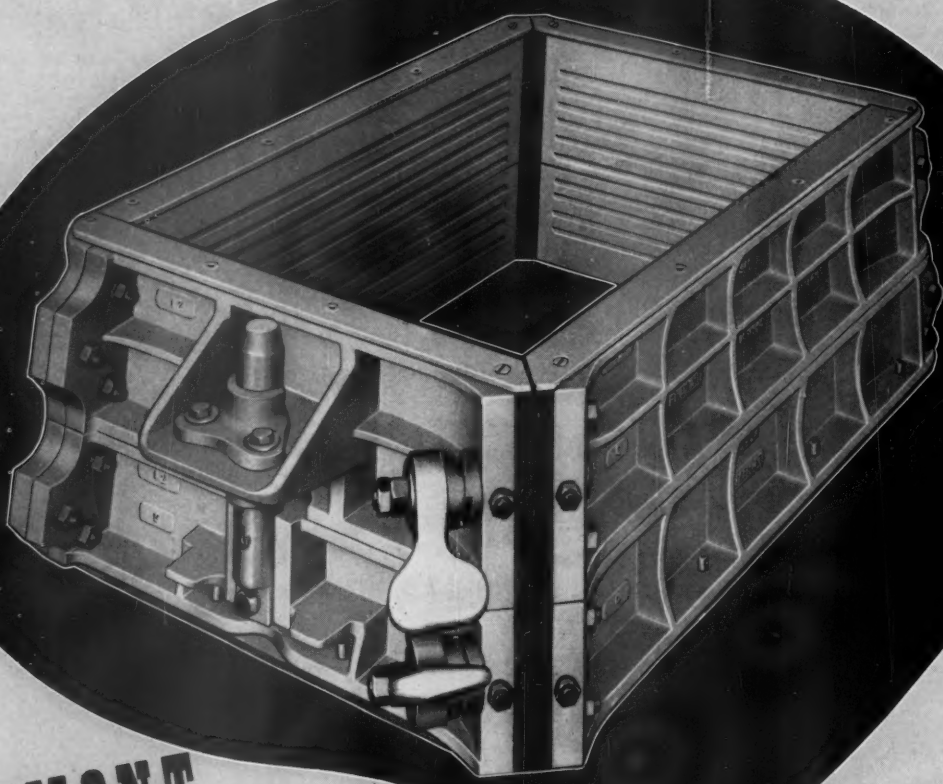
Heroult
ELECTRIC MELTING FURNACES

AMERICAN BRIDGE DIVISION
UNITED STATES STEEL CORPORATION, GENERAL OFFICES:
525 WILLIAM PENN PLACE, PITTSBURGH, PA.
Contracting Offices in New York, Philadelphia, Chicago, San Francisco and other principal cities.
United States Steel Export Company, New York

SEE THE UNITED STATES STEEL HOUR. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

UNITED STATES STEEL

There's a world of difference in flasks!



FREMONT MAGNESIUM SPREADLOCK FLASKS

SAND CANNOT LODGE IN CORNERS

Long-life, easily replaceable, live rubber corner inserts completely close the corner gaps.

LONGER SERVICE

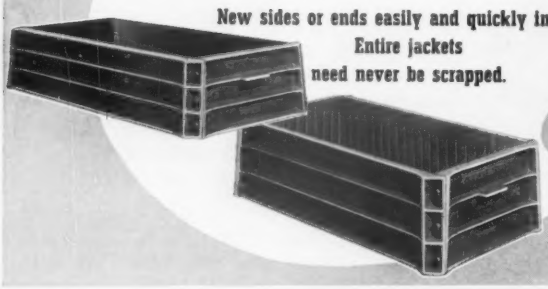
New two-piece male and female stop, inserted above and below the stud bolt, results in tremendous corner strength. Hardened forged steel cams.

LIGHTER, EASIER HANDLING

Write today for free literature and prices.

FREMONT CAST IRON OR CAST ALUMINUM JACKETS

New sides or ends easily and quickly inserted. Entire jackets need never be scrapped.



The Fremont FLASK Co.
FREMONT, OHIO

How can you bear being up a tree?

Do SNAGGING PROBLEMS have you in a bearish mood? Or maybe you're out on a limb because of wasted snagging time in your cleaning room. Or perhaps you're growling because of high snagging costs. Then it's high time to switch to CINCINNATI (PD)° SNAGGING WHEELS—the greatest grinding development in years.

Customers all over the Nation report that the fast, easy cutting action of CINCINNATI (PD) SNAGGING WHEELS really cuts snagging time . . . and thus saves money.

Our customers report, too, that POSITIVE DUPLICATION (PD) means *another* savings. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

CINCINNATI (PD) WHEELS are made in vitrified and resinoid bonds for both ferrous and nonferrous foundries and are available in a complete variety of sizes and shapes. *And these better, cost-cutting* (PD) SNAGGING WHEELS *are priced no higher than ordinary wheels.*

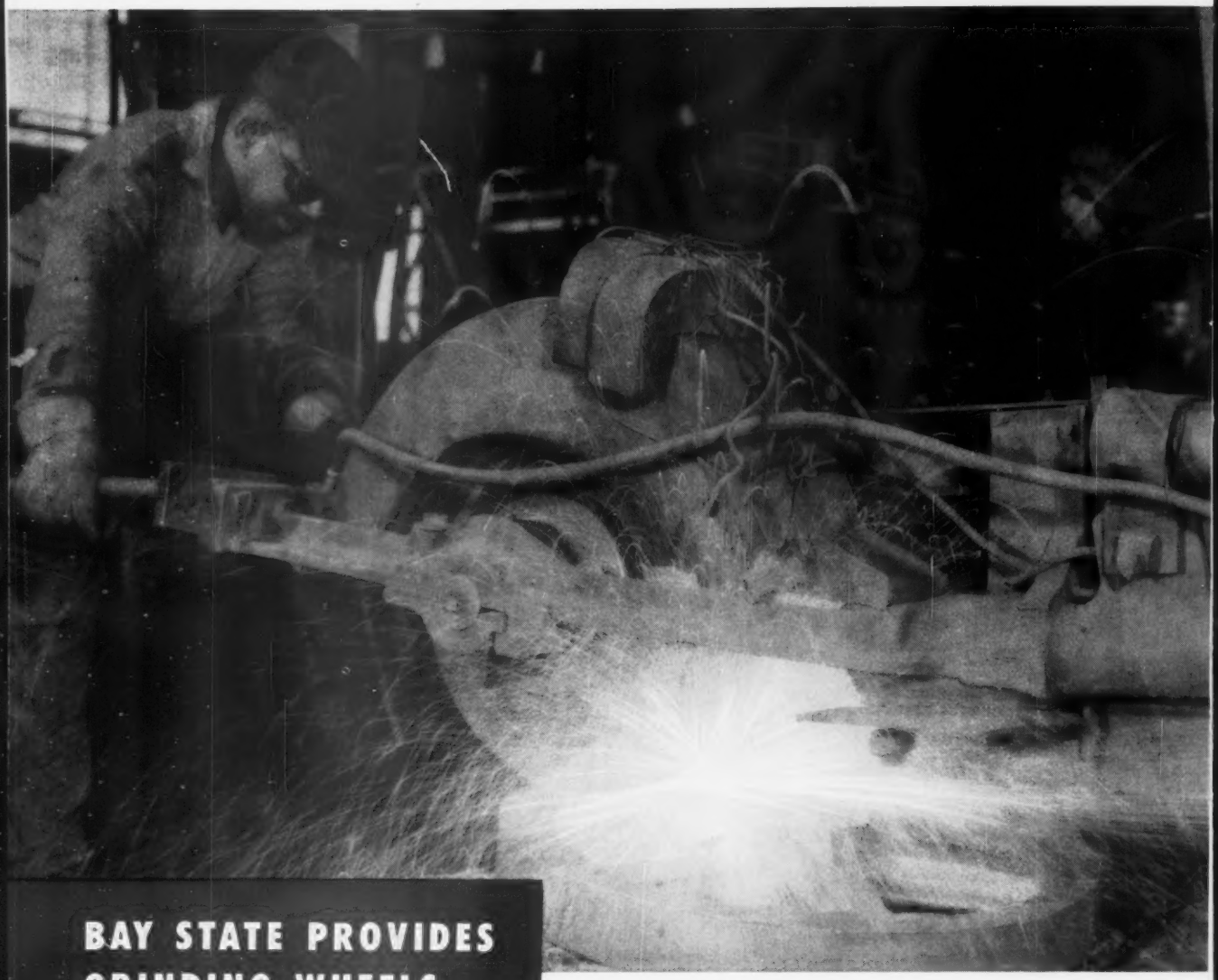
For the bare, down-to-earth facts on how to save money on snagging and increase production, contact your CINCINNATI Grinding Wheels distributor. Or, contact us direct. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

CINCINNATI°
Grinding Wheels

A PRODUCTION-PROVED PRODUCT OF
THE CINCINNATI MILLING MACHINE CO.

°Trade Mark Reg. U. S. Pat. Off.

Circle 567 on Inquiry Card—Page 209



BAY STATE PROVIDES GRINDING WHEELS FOR EVERY CLEANING ROOM JOB

FOR SWING FRAME SNAGGING, rugged resinoid bonded snagging wheels grind fast and efficiently where there's a lot of metal to take off.

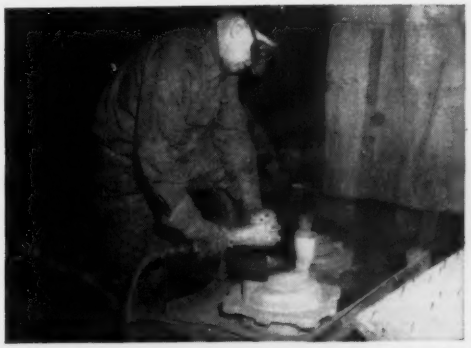
Because Its Service is Complete, Bay State is Your Surest Way to Lower Foundry Grinding Costs.

Foundries do over 20% of the grinding done in this country! That's a good reason why a large part of the Bay State research, development, and engineer-training programs concentrate entirely on foundry grinding wheels.

It's this concentration which has given Bay State a complete line of products plus outstanding abrasive engineers . . . and you need *both* to take advantage of *every* chance to cut your grinding costs.

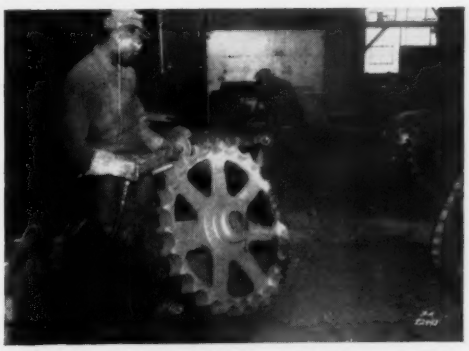
It makes sense that your surest way to lower foundry grinding costs comes from the company which is best equipped with every product and service required for the job. Try it, by calling in your Bay State Distributor, or writing direct to Bay State Abrasive Products Company, Westboro, Massachusetts.

Circle 568 on Inquiry Card—Page 209



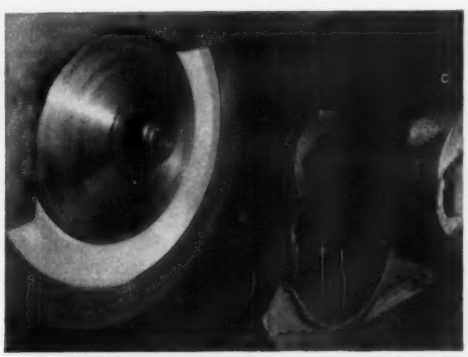
FOR NOTCHING GATES AND RISERS, and cleaning castings, Bay State provides *five* different raised hub disc-wheels to grind everything from Aluminum to Stainless.

FOR LIGHT PORTABLE GRINDING, small wheels, cones, plugs, and mounted wheels in all standard sizes, shapes, and specifications. Vitrified, resinoid, and Bayflex bonds.



FOR HEAVY PORTABLE SNAGGING, straight wheels and flaring cups of all sizes, for both high and low speed machines, right angle head or straight, to fit any shaft.

FOR FLOOR STAND SNAGGING, vitrified resinoid, and Bayflex bonded straight wheels to fit any machine mounting, and in specifications for any metal.



FOR CUTTING OFF, *three* different reinforced cut-off wheel designs, plus rubber and resinoid non-reinforced types . . . a product for every foundry cut-off job.

BAY STATE®

WHEELS of PROGRESS

BAY STATE ABRASIVE PRODUCTS CO., Westboro, Massachusetts, U. S. A.

Branch Offices and Warehouses: Bristol, Conn., Chicago, Ill., Cleveland, Ohio, Detroit, Mich., Pittsburgh, Pa.
Distributors — All principal cities • In Canada: Bay State Abrasive Products Co. (Canada) Ltd., Brantford, Ont.

TOWMOTOR CORPORATION

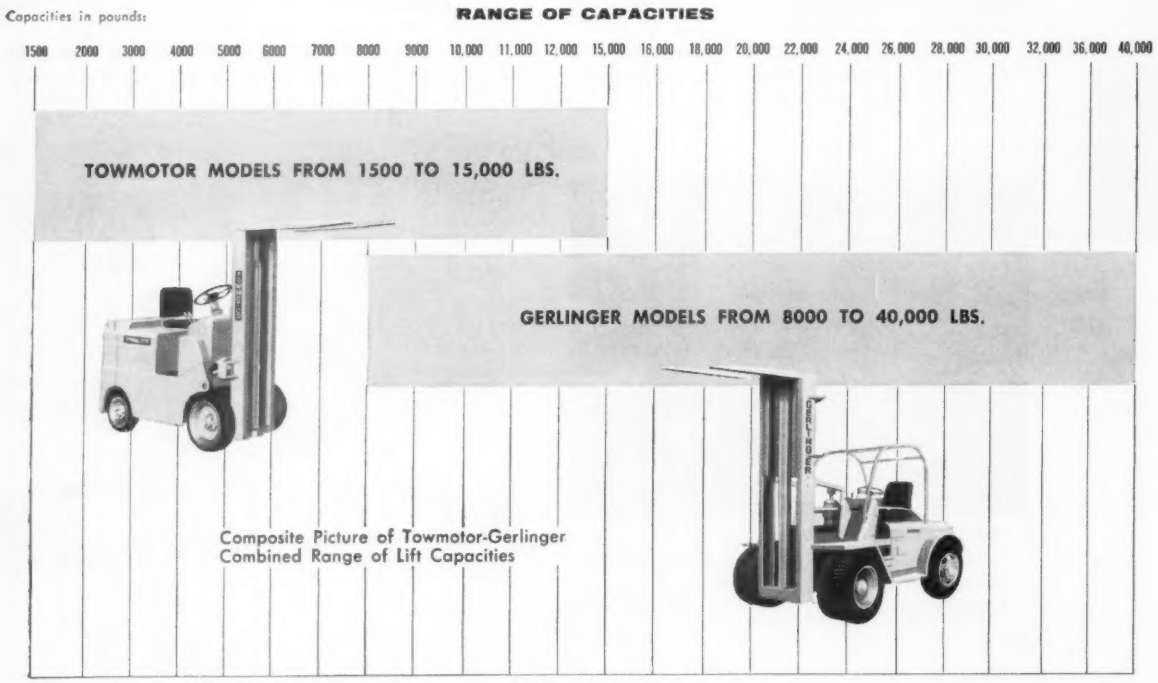
announces the joining of two great names in the materials handling industry...

TOWMOTOR
THE ONE-MAN-GANG

GERLINGER
PRODUCTS

- *Gerlinger Carrier Co., Dallas, Oregon becomes a wholly-owned subsidiary of Towmotor Corp.*
- *Effective immediately, Gerlinger lift trucks and material carriers to be sold and serviced by most Towmotor representatives.*
- *Products pooled make Towmotor-Gerlinger industry's biggest lift truck line; capacity range: 1,500 to 40,000 lbs.*

You will find a big step forward has been made in modern materials handling with the joining of these two customer-service-minded firms. Both Towmotor and Gerlinger were established in 1919 and are both known for their achievements in their own particular range. They are now combined to supply the requirements of the largest and smallest users of lift trucks and carriers. Both groups of production and research engineers—and the widespread service organization of each—will supplement each other to better serve American industry's future needs inside and outside the plant.



Composite Picture of Towmotor-Gerlinger Combined Range of Lift Capacities

Gerlinger Carrier Co. is a wholly-owned subsidiary of Towmotor Corporation, Cleveland 10, Ohio

TOWMOTOR ® - GERLINGER

FORK LIFT TRUCKS • TRACTORS • MATERIAL CARRIERS

Circle 569 on Inquiry Card—Page 209

Do any portable grinding job FASTER and EASIER with these AIRETOOL GRINDERS!

NEW! AIR-POWERED! LIGHT-WEIGHT!

MODEL 700
HORIZONTAL
GRINDER

MODEL 700-A
RIGHT-ANGLE
GRINDER

ABRASIVE BELT ATTACHMENT for fine finishing on dies, molds, seam welds or any contour surface.

FLEXIBLE DISC may be used on right-angle head for polishing curved surfaces.

AIRETOOL . . . pioneer in air motor design and development introduces these new, lightweight, portable tools for greater efficiency and lower operating cost on grinding, buffing and polishing operations.

Maximum speed and driving power is generated by the precision built "Power-Seal" design motor. Interruptions from stalling or overheating are eliminated. Housing is cast from special quality aluminum alloy for extra strength and lightness. Smooth balanced design and accurate control button makes operation safe, easy and effective on any metal removal job.

For the complete story on how Airetool can speed up your grinding operations and reduce costs, send for Bulletin No. 61.

BRANCH OFFICES: New York, Chicago, Tulsa, Philadelphia, Houston, Baton Rouge.
REPRESENTATIVES: in principal cities of U.S.A., Canada, Mexico, South America, England, Europe, Puerto Rico, Italy, Japan, Hawaii.
EUROPEAN PLANT: Vlaardingen, The Netherlands.
CANADIAN PLANT: 37 Spalding Drive, Brantford, Ontario.

Automatic MONORAIL

Delivers 25 Tons Daily

One man uses push-button control to load, automatically dispatch, over four tracks, and dump fresh core sand at any of 24 stations.

This flexible American Monorail System is tied in with manually operated track switches. Stations may be increased to 16 per track.

This American Monorail installation is typical of hundreds which have sharply cut handling costs.

Today call your nearby American Monorail Representative or write us.

Member of Materials Handling Institute • MonoRail Association

AMERICAN OVERHEAD HANDLING EQUIPMENT

MONORAIL COMPANY

13104 ATHENS AVENUE
CLEVELAND 7, OHIO

[IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.]

Looking for Cleaner Metals?

The Answer is SOFFEL'S NON-FERROUS FLUXES

BB-2—For red brass, nickel and tin bronze pressure castings—removes sulfur, iron, phosphorous oxides and gas from brass and bronze.

SUPER BRASS FLUX—For brass and bronze—prevents oxidation of zinc.

BRASS REFINING FLUX—For cupola melting and open flame furnaces—prevents oxidation. Produces liquid slag and faster melting.

COVERALL BRASS FLUX—Removes gas and oxides from yellow brass and nickel silver.

RADIOCLARITE BRASS FLUX—For open flame furnace melting—increases fluidity, tensile strength, removes gas, oxides and iron.

AB-6 BRASS FLUX—For electric furnace melting of brass and aluminum bronze—keeps furnace linings clean.

KLEEN-ALL BRASS CLEANER—For use in bottom of pouring ladles or open flame furnaces to absorb liquid slag and keep the furnace and ladle linings clean.

BRASS ALUMINUM REMOVER—Removes all traces of aluminum from copper, brass or bronze.

HI-LED BRONZE FLUX—Holds lead up to 50% in copper without use of nickel.

ALUMINUM BRONZE FLUX—A perfect deoxidizer for reducing aluminum and iron oxide in manganese bronze and aluminum bronze. Adds fluidity.

COPPERTITE FLUX—For high conductivity castings—removes cuprous and cupric oxides and gas from copper.

FERRO-OUT IRON REMOVER—Removes free iron or alloyed iron from brass, bronze or copper.

SOFFELITE ALUMINUM FLUX—Removes aluminum oxide and iron from aluminum and increases the fluidity and tensile strength.

MAGNALUM FLUX—For magnesium and aluminum alloys—removes gas and oxide and increases fluidity.

KLEN ZINC FLUX—A deoxidizer and purifier for zinc base pressure die castings—removes gas, sulfur and iron.

DIE COATING—For pressure zinc base die castings—will not scale, blister or create gas in the molds.

PERMANENT MOLD COATING—For aluminum and magnesium castings—adds longer life to molds. Produces clean gas free castings.

POT COATING—For iron pot melting—increases life of pots. Prevents iron pick up.

Our years of experience in serving the needs of practical foundrymen have demonstrated that fluxes in powder form give a quicker, cleaner action than any other form.

Ask Your Nearest PMP CO. Distributor for Samples

UNITED STATES:

ARLINGTON 74, MASSACHUSETTS
Malcolm G. Stevens
78 Summer St.
PHONE: MI 8-4112 · 8-4113

BIRMINGHAM, ALABAMA
Foundry Service Company
2321-2329—29th Ave., No.
PHONE: Birmingham 4-4754

BOSTON 11, MASSACHUSETTS
Klein-Farris Co., Inc.
683 Atlantic Ave.
PHONE: Hancock 6-1210

BUFFALO 12, NEW YORK
Frederic B. Stevens, Inc.
93 Stone St.
PHONE: Taylor 2091

DETROIT 16, MICHIGAN
Frederic B. Stevens, Inc.
1800—18th St.
PHONE: Tashmoo 5-0725

EDWARDSVILLE, ILLINOIS
Midwest Foundry Supply Co.
270 W. Union St.
PHONE: Edwardsville 76

HOUSTON 2, TEXAS
Eltex Chemical Company
119 Main Street
PHONE: Fairfax 3-8351

INDIANAPOLIS 7, INDIANA
Frederic B. Stevens, Inc.
4000 East 16th St.
PHONE: Fleetwood 7-8302

KANSAS CITY 2, KANSAS
Lloyd Canfield Foundry Supplies
Inter-State Storage Bldg., 1721 Minnesota Ave.
PHONE: Drexel 1-0034

LOS ANGELES 22, CALIFORNIA
Pacific Graphite Co., Inc.
2522 Malt Ave.
PHONE: Underhill 0-5215

MILWAUKEE 46, WISCONSIN
Milwaukee Chaplet & Supply Corp.
1023 So. 40th St.
PHONE: Evergreen 3-2900

MINNEAPOLIS 14, MINNESOTA
Smith-Sharpe Company
117—27th Ave., S.E.
PHONE: Franklin 1-1345 · Franklin 1-2156

NEW HAVEN 11, CONNECTICUT
Frederic B. Stevens, Inc.
168 Brewery St.
PHONE: University 5-0501

OAKLAND 8, CALIFORNIA
Pacific Graphite Co., Inc.
40th & Linden Sts.
PHONE: Olympic 8-3300

PHILADELPHIA 49, PENNSYLVANIA
Robert G. Dyer Company
6929 Sylvester St.
PHONE: Fidelity 2-1154

PORTLAND 1, OREGON
LaGrand Industrial Supply Co.
15 S.W. Arthur St.
PHONE: Capitol 7-3683

SEATTLE 4, WASHINGTON
Carl F. Miller & Co., Inc.
2450 Sixth Ave., So.
PHONE: Seneca 6668

WEBSTER GROVES 19, MISSOURI
Walter A. Zeis
2 Armin St.
PHONE: Woodland 1-5097

CANADA:

TORONTO 3, ONTARIO
Canadian Hanson & Van Winkle Co., Ltd.
Silver & Morrow Aves.
PHONE: Kenwood 1136

TORONTO 10, ONTARIO
C. C. MacDonald
1723 Dufferin St.
PHONE: Kenwood 1703

VANCOUVER, B. C.
Overseas Commodities, Ltd.
750 Industrial Ave.
PHONE: Tatlow 8531

VANCOUVER, B. C.
Shanahan's Ltd.
1050 Glen Drive
PHONE: Pacific 3101

PITTSBURGH METALS PURIFYING CO., Inc.
1352 Marvista St., N. S. Pittsburgh 12, Pa.

"WORLD'S LARGEST MANUFACTURER OF FLUXES, PURIFIERS AND EXOTHERMIC COMPOUNDS FOR ALL METALS AND ALLOYS"

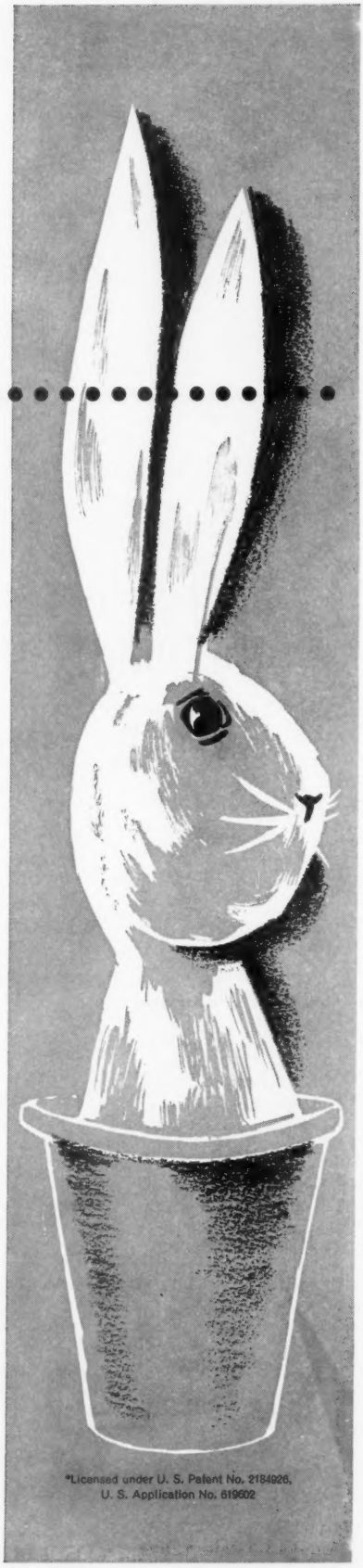
Circle 572 on Inquiry Card—Page 209

PERMABRASIVE is the only pearlitic malleable iron shot and grit on the market. Pearlitic malleable iron is made with the proper analysis and controlled heat treatment. The result is malleable iron with a more durable structure and, in abrasives, "pearlitic" means a greater resistance to break down, longer life, greater cleaning ability with all the advantages of lower abrasive costs, lower maintenance costs, faster cleaning!

"Pearlitic"..... is a magic word!

National Metal has been making pearlitic malleable shot and grit for several years. Permabrasive—the only pearlitic malleable shot and grit—has been a pioneer in the field of premium quality abrasives and has saved thousands of dollars for hundreds of foundries!

Sure, Permabrasive pearlitic malleable shot and grit costs a little more per ton than ordinary annealed abrasives. That's because it costs more to make. But its use has snow-balled, because it saves money on abrasives used and cuts maintenance costs substantially. *Your* savings are *guaranteed in writing* when Permabrasive goes to work in your blast cleaning room.



*Licensed under U. S. Patent No. 2184926, U. S. Application No. 619602

TIRED OF TESTING?

No one blames you for being tired of making endless, complicated tests to prove every claim that comes along! We suggest you use a "time-meter"—and reduce your operation to simple "wheel-hours." An office boy can keep the records—doesn't interfere with operations—gives you all the dope you need on abrasive consumption, evaluating materials and equipment parts, and furnishes excellent cost records. Write for free folder: "Tired of Testing!"

PERMABRASIVE* PEARLITIC MALLEABLE SHOT AND GRIT IS PRODUCED EXCLUSIVELY BY

NATIONAL METAL ABRASIVE COMPANY

3569 NORTON RD. • CLEVELAND 11, OHIO

SOLD EXCLUSIVELY BY

HICKMAN, WILLIAMS & COMPANY

(INCORPORATED)

CHICAGO, DETROIT, CINCINNATI, ST. LOUIS, NEW YORK, CLEVELAND, PHILADELPHIA, PITTSBURGH, INDIANAPOLIS

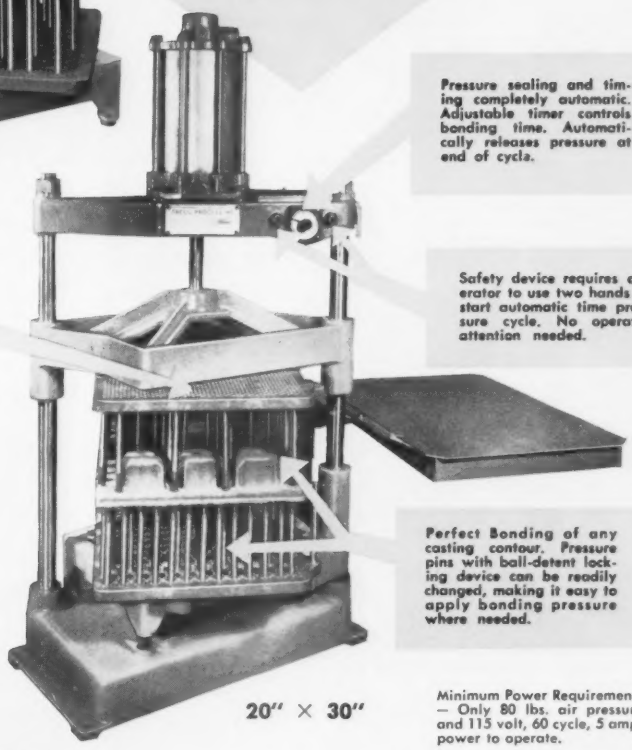
Here's why SHELL PROCESS BONDING FIXTURES are so Popular!

24" × 30"

Pressure sealing and timing completely automatic. Adjustable timer controls bonding time. Automatically releases pressure at end of cycle.

Minimum Change-over time. Due to number of holes in pressure plate and ease with which pressure pins can be moved, only minutes are required to change from one casting contour to another.

Safety device requires operator to use two hands to start automatic time pressure cycle. No operator attention needed.



Perfect Bonding of any casting contour. Pressure pins with ball-detent locking device can be readily changed, making it easy to apply bonding pressure where needed.

20" × 30"

Minimum Power Requirements — Only 80 lbs. air pressure and 115 volt, 60 cycle, 5 amp. power to operate.

15" × 20"

With Shell Process bonding fixtures on the job, any Shell molding operation is more profitable. Write today for further information on the Shell Bonder that has become the standard in the Foundry Shell Molding field.

SHELL PROCESS, INC.

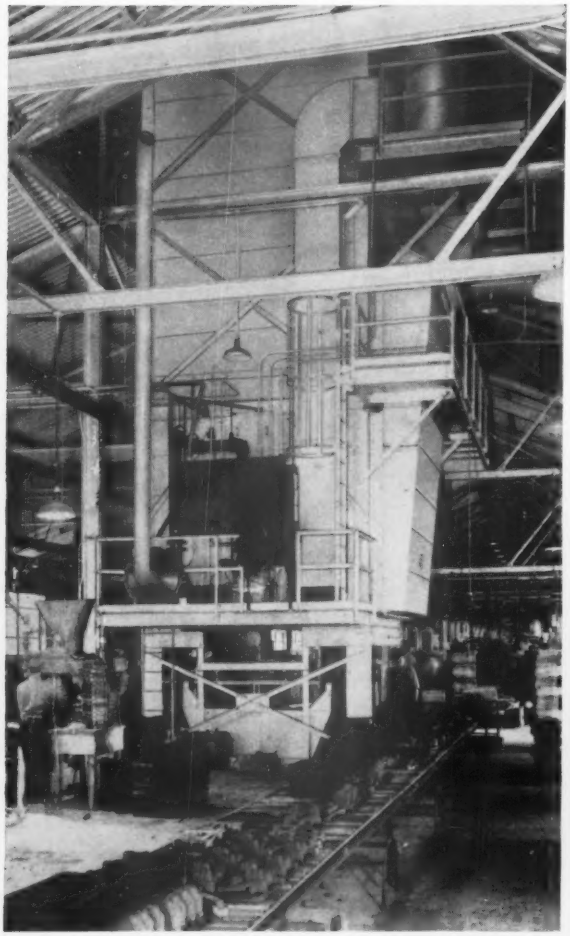
Manufacturers of Shell Molding Machines and Allied Equipment

366 BLISS STREET • WEST SPRINGFIELD • MASS.

COLEMAN

lead to

and



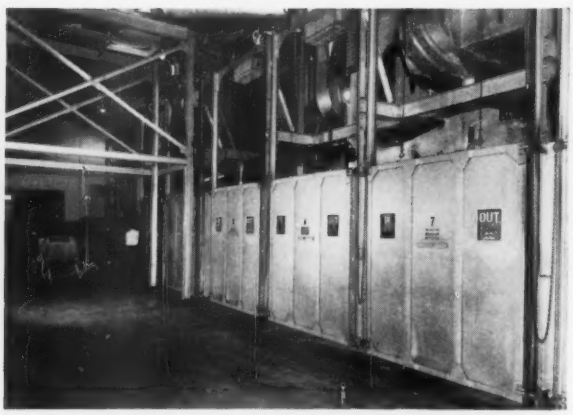
Coleman Tower® Oven

Your out-dated core and mold ovens may be costing you thousands of dollars . . . because they cannot provide the production savings you can realize from modern, efficient Coleman Ovens.

The exclusive advantages of Coleman Ovens are reflected in instant improvement in cores, molds and casting quality. In many installations the immediate reduction of scrap losses . . . and substantial savings in fuel, material and labor have enabled users to pay for a new Coleman Oven in less than a year.

Since production savings are so vital to your profits . . . isn't it worth your time *now* to investigate the advantages of Coleman Ovens. Our experienced engineers are available without obligation to give practical suggestions for your particular requirements.

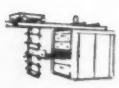
WRITE FOR BULLETIN 54



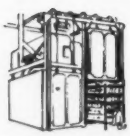
Coleman Transrack Ovens

Let us recommend the RIGHT type of core or mold oven for your requirements — we make them ALL!

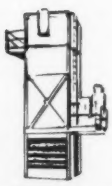
COLEMAN PORTABLE CORE OVENS



COLEMAN ROLLING DRAWER CORE OVENS



COLEMAN TRANSRACK CORE OVENS



COLEMAN TOWER CORE OVENS

OVENS

production savings

greater profits

Coleman Dielectric Oven

Only COLEMAN offers a complete line of foundry ovens with all these advantages

RECIRCULATING HEATING OR DIELECTRIC SYSTEMS to meet your requirement best.

DEPENDABLE BAKING AND DRYING. Coleman Ovens remove all uncertainties in core baking and mold drying. Rejects and make-overs are eliminated.

INCREASED LABOR SAVING. Efficient and modern mechanical designs reduce handling and other indirect labor to a minimum.

HEAVY DUTY CONSTRUCTION. Responsible for dependable performance, economical operation, and minimum maintenance cost under rugged service requirements.

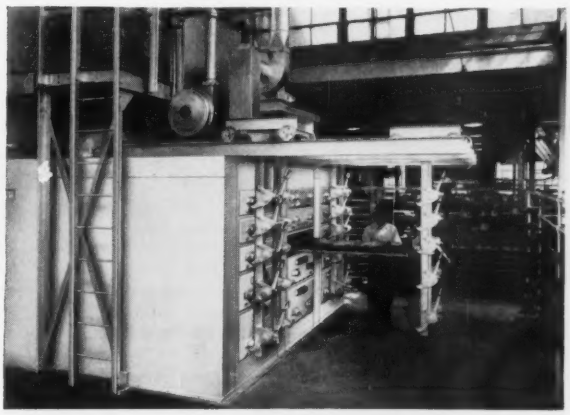
MAXIMUM FUEL ECONOMY. Coleman Heating Systems use the most economical fuel available to you — gas, oil, stoker-coal, electricity, etc.

FLEXIBILITY AND ACCURATE CONTROL to bake oil or resin binders — whichever is most satisfactory for your requirements.

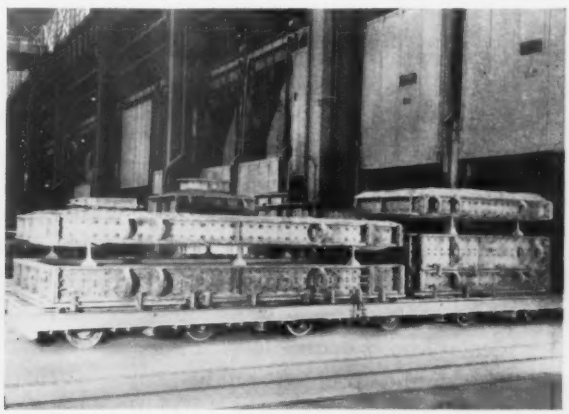
BETTER WORKING CONDITIONS. Positive ventilation built into Coleman Ovens prevents leakage of fumes and gases — helps to make the core department a good place to work.

ADVANCED OVEN "KNOW-HOW". Coleman Engineers have pioneered and developed the most efficient oven designs to meet the highly specialized needs of modern foundry methods in all classes of work.

WIDEST EXPERIENCE. Gained through more than half a century of specialization in foundry ovens and the building of over 11,000 successful Coleman Oven installations.



Coleman Rolling Drawer Ovens

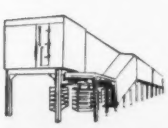


Coleman Car Type Mold Ovens

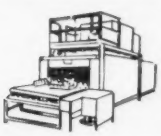
THE FOUNDRY EQUIPMENT COMPANY

1821 COLUMBUS ROAD — CLEVELAND 13, OHIO

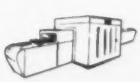
World's Oldest and Largest Foundry Oven Specialists



COLEMAN HORIZONTAL CONVEYOR CORE OVENS

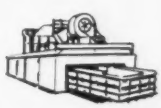


COLEMAN CONVEYOR REDRY OVENS

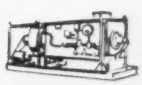


COLEMAN DIELECTRIC CORE OVENS

COLEMAN CAR-TYPE OVENS



COLEMAN HIGH-SPEED MOLD OVENS



COLEMAN PORTABLE MOLD DRYERS

HYSTER MAKES THE *RIGHT* INDUSTRIAL TRUCK FOR YOUR JOB

LP-Gas equipped Hyster 80 with boom attachment transporting castings in steel bins. Truck handles raw steel products, rough castings and heavy-duty jobs around pouring and casting departments.

Pictured above is one of many typical examples of how Hyster® Industrial Trucks are helping to effect tremendous savings in the cost of materials handling in Foundries.

Even if you are now using lift trucks or have never used industrial trucks of any kind, your Hyster dealer can show you how you can quickly realize more profit from your operation with these multi-purpose utility tools. Your Hyster dealer knows materials handling . . . he is an expert on the problems and their solution. He can help you with special techniques and cost reducing methods. Call him today...why not take advantage of his materials handling know-how? He is listed under "Trucks-Industrial" in your telephone directory.

HYSTER DEALERS GIVE YOU ALL 3!

1 **PLANNING**—your Hyster Dealer will plan your materials handling operation from scratch, or will analyze your present system to see if it can be improved.

2 **THE RIGHT TRUCK** — for *your* job from Hyster's complete line of industrial trucks (1,000-30,000 lbs.) and over 100 job-attachments for economical load handling.

3 **THE RIGHT SERVICE** — ample spare parts stock, shop facilities, factory-trained mechanics and an efficient field service that keep your Hyster lift trucks going on your job, wherever your job might be located. Hyster trucks are noted the world over for their low downtime.

Materials Handling Trucks from 1,000 to 30,000 pound capacities

2902-30 N. E. CLACKAMAS, PORTLAND 8, OREGON
1010-30 MYERS STREET.....DANVILLE, ILLINOIS
HYSTER N.V. .....NIJMEGEN, THE NETHERLANDS
FACTORIES: Portland, Oregon; Danville, Illinois; Peoria, Illinois; Nijmegen, The Netherlands.

HYSTER

HYSTER COMPANY

Ready to Blast!

Reduce Nozzle Changing with Long Life

NORBIDE® Nozzles

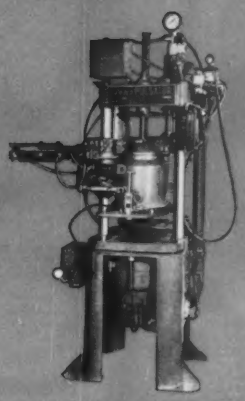
These rugged nozzles — lined with NORBIDE Boron Carbide, the hardest manufactured material commercially available—maintain stream contour and last hundreds of hours longer than any other nozzle made, eliminating expensive nozzle changing.

Available in a variety of sizes and styles. Try 'em on your toughest blasting jobs. For full details, write for your free copy of Form 543.

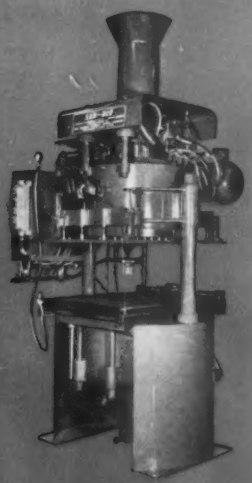
NORTON COMPANY
43 New Bond Street, Worcester 6, Mass.

NORTON
BORON CARBIDE

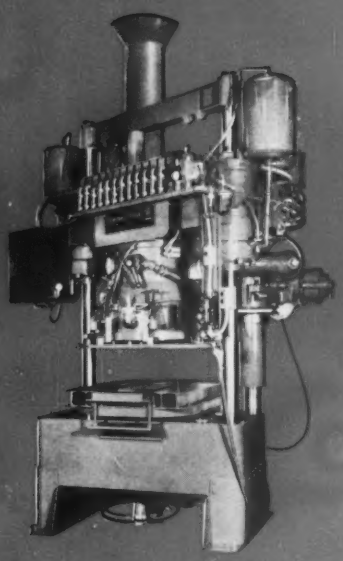
NORBIDE® ... *The Longest Nozzle Life You Can Buy*



for cores weighing
up to 40 lbs. each



for cores weighing
up to 150 lbs. each



for cores weighing
up to 250 lbs. each

SAN-BLO®

dedicated to

Originally presented at the 1950 Foundry Show in Cleveland, the SAN-BLO core blower abruptly revolutionized the machine-production of cores. It was the first core making machine to explore and make use of the amazing possibilities of "automation" for blowing cores...faster, better and more economically... with any core sand mixture.

Manufactured by *San-Blo Division*

advancement in core production!

SAN-BLO introduced the first "mechanized" sand chamber, or blow head, with motor-driven agitator and "aerating" air circuit, to eliminate "flowability" as a critical factor in the preparation of core sand mixtures. These exclusive features permit the use of the same sand chamber for producing both small and large cores, eliminate "piping" and permit the proper location of blow holes in the blow plate, to minimize horizontal sand travel in the core box.

SAN-BLO pioneered automatic core blowing to speed up and standardize the rate of core production, utilizing electronic devices to provide single-push-button control and electric timing of the blow cycle. Automatic, electric controls make obsolete the manual-control operation of core machines.

SAN-BLO perfected "LPP" (low pressure prefill) to minimize core box wear and subsequent repairs. It developed "Pulsating" blow action to permit the safe blowing of wooden core boxes without the need for special, protective rigging. These two remarkable techniques, plus the "mechanized" blow head, make possible the full utilization of compressed air as a "lubricant" for the movement of sand from blow head to core box. They first provide for the filling of the core box with sand propelled by only a few pounds air pressure (LPP), followed immediately by the introduction of sand under pulsating, full line pressure, to pack the sand to proper hardness. No other "blow" or "shoot" can match this method of core making, in providing both core box protection and correct packing of the sand.

Another SAN-BLO development was the "Quick-Change Blow and Vent Plate Assembly" for open-top core boxes. This modern device provides for changing from job to job in a matter of seconds. No longer is it necessary to stop production to change blow head and blow plate, when changing boxes. No longer is it necessary to invest hundreds of dollars in a number of different size blow heads — when simple, inexpensive blow sheets will do the same job.

Foundrymen, both jobbing and production, who realize that the full utilization of modern, automatic machines is the only answer to core production problems, will turn to machines incorporating modern design. These foundrymen, therefore, are invited to investigate the SAN-BLO . . . tomorrow's core blower, ready to do a better job of making cores, today!

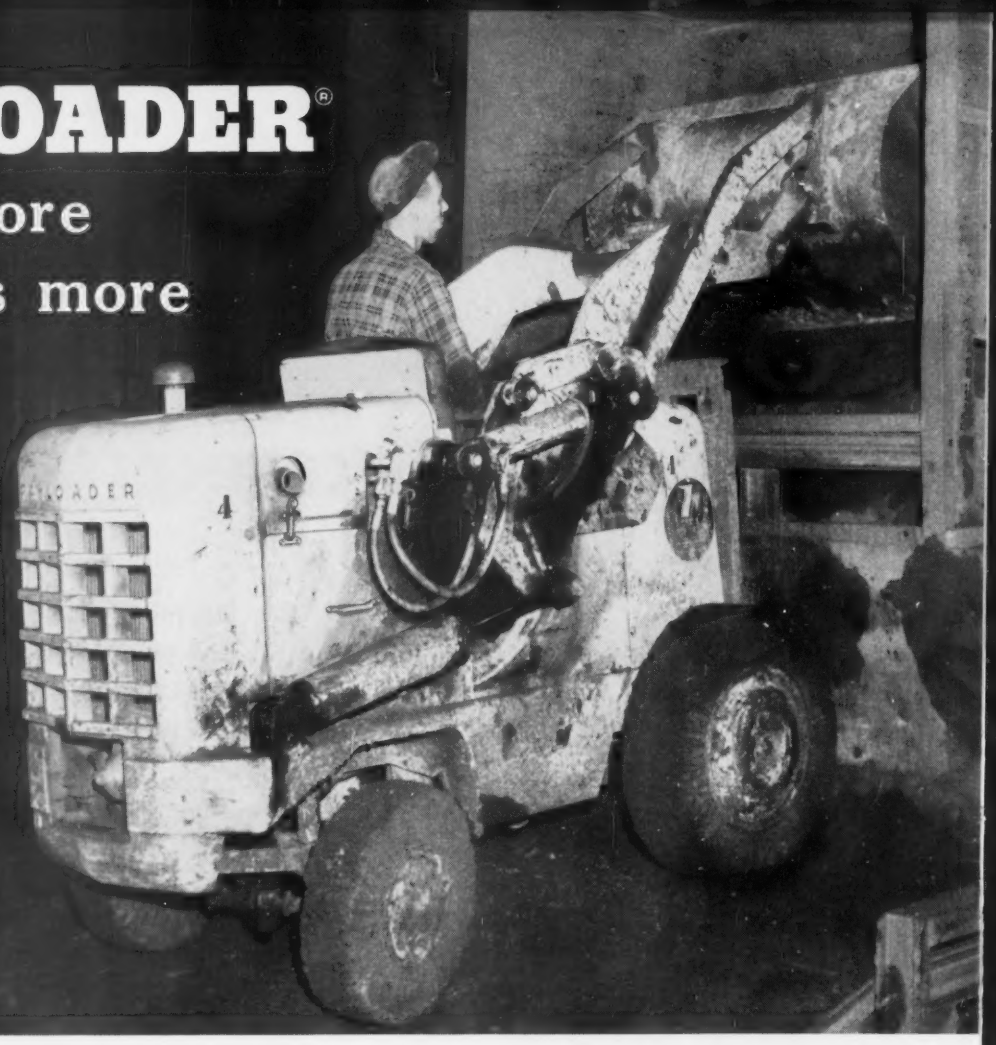
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

The FEDERAL FOUNDRY SUPPLY Company 4600 EAST 71st STREET · CLEVELAND 5, OHIO

Circle 578 on Inquiry Card—Page 209

PAYLOADER®

..does more
..endures more



What makes an HA PAYLOADER® best for your jobs?

Shortest turning radius
Highest dumping height
Biggest bucket (18 cu. ft. Payload)
Hydraulic load-shock-absorber
40° bucket tip-back at ground level
Exclusive, one-lever bucket control

THE FRANK G. HOUGH CO.
703 SUNNYSIDE AVE., LIBERTYVILLE, ILL.

Send data on "PAYLOADER" tractor-shovels

☐ HA (18 cu. ft.) and HAH (1 cu. yd.)
☐ Larger models to 2¼ cu. yd.

Name _____

Title _____

Company _____

Street _____

City _____

State _____

18

A tractor shovel *has* to be good to stand up to 5,000 hours of work a year in tough foundry service. One "PAYLOADER" model HA has done it for nearly 2 years and the second for nearly a year and they are both still going strong 16 hours a day, 6 days a week at Frazer and Jones Company, Syracuse. Milton Donahue, Night Foreman, praises them in these words, "The HA torque converter model is ideal for this job. It's short, insuring excellent maneuverability, has plenty of power to work fast. The self-loading roll-back bucket design enables the operator to load from floor level. I have put the HA against all foundry jobs with outstanding production. Downtime has been very low because it's designed and built for rugged work." These HA's take up sand from pouring floor, feed sand to hopper for reprocessing, windrow sand for cutter — also handle coal and help on furnace maintenance.

Owners *expect* more from a "PAYLOADER" and *get* more because more "PAYLOADER" tractor-shovels are in service than all other wheeled tractor-shovels put together and they are backed by 35 years of tractor-shovel pioneering. There's a "PAYLOADER" size and type to fit *your* needs and a nearby Distributor ready to serve you right.

SAY "HUFF"

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

Circle 579 on Inquiry Card—Page 209

Late News

BRAZILIAN FOUNDRY: Central Foundry Division, General Motors Corp., is preparing plans for a large mechanized gray iron and malleable foundry to be built near Sao Paulo, Brazil, by GM's Brazilian subsidiary. The foundry will supply engine blocks and other castings to a new engine manufacturing plant also to be built there as part of a truck manufacturing program.

The new foundry, to be similar in design to Central Foundry's Defiance, Ohio, plant, will have about 200,000 sq ft of floor space. Production of 65 tons of castings per 8-hr day is planned initially from two mechanized sand molding lines. Robert H. Mooney, Central Foundry Division works engineer, is in charge of over-all plans for the foundry. GM's investment in machinery and equipment for the foundry and machine shop is about $10 million.

SCRAP EXPORTS: Congress shortly will have the Department of Commerce's report on scrap supply, including results of the survey on the subject made for the latter by Battelle Memorial Institute. The study will have an important bearing on what action, if any, is taken to curb scrap exports, which last year reached a new peak—topping 5½ million tons, it is estimated.

The domestic scrap market continues soft. Prices have slid steadily for nearly two months. Steelmaking grades still are quoted 15 to 20 per cent higher than a year ago, but cast scrap prices are down to about the levels of last January.

CAR BACKLOG HIGH: Backlogs of freight car builders on Jan. 1 represented 16 months' operations at the December delivery rate of 7260 cars. Unfilled orders totaled 117,257 cars. Shops of the railroads and independent car builders delivered 67,080 cars last year, against 36,896 in 1955. Orders placed in 1956 for 41,223 cars compare with 169,872 in 1955 and 23,324 in 1954.

CAST VS FORGED: Ford and Pontiac spokesmen pointed to advantages in machining costs and wear properties of cast crankshafts, in speaking before the recent national convention of the Society of Automotive Engineers. Compared with forged cranks, the cast product wears 60 per cent better, it was said, while 50 per cent longer tool life and a 45 per cent reduction in amount of metal removed in machining was reported.

HEADS MALLEABLE FOUNDATION: William E. Mahin has been elected president of the Malleable Research & Development Foundation, which was organized last September to develop new products, better processes and improved equipment for production malleable foundries. Mr. Mahin is past technical director of Vanadium Corp. of America and recently was vice president and director of research, Hunter Engineering Co., Riverside, Calif., and a management consultant specializing in research and development problems. Belle City Malleable Iron Co., Racine, Wis., has been admitted as the first new member of the foundation, which was founded by Albion Malleable Iron Co., Auto Specialties Mfg. Co., Dayton Malleable Iron Co., National Malleable & Steel Castings Co., and Wagner Malleable Iron Co. Charles S. Anderson, president of Belle City, has been elected a trustee of the foundation.

DOMESTIC MANGANESE: U. S. Manganese Corp. has been formed to produce manganese from domestic ores. The government has awarded a $270,541 contract for a pilot plant to develop commercial practices for production of manganese from rhodonite. The new company was incorporated by Vitro Corp. of America, Sheer-Korman Associates Inc. and Great Divide Mining & Milling Corp.

CUTS SILICATE PRICE: Carbide & Carbon Chemicals Co. has reduced ethyl silicate 5 cents a pound. Ethyl silicate is used as an investment casting mold binder.

PERSONALS: Clifford E. Wenninger, technical director, Hydro-Blast Corp., Chicago, has been named technical director, Beardsley & Piper Division, Pettibone Mulliken Corp., Chicago . . .

Warren W. Brown, vice president, Carondolet Foundry Co., St. Louis, has been appointed manager, sales and marketing, Superior Foundry Inc., Cleveland. Norman Petitte, Superior sales engineer, is new assistant sales manager . . . A. W. Sokolowski, chief engineer, the Lanly Co., Cleveland, has also been made vice president, engineering . . . W. G. Greenlee, president, Greenlee Foundries Inc., Chicago, has succeeded Frank J. Sherwin, president, Chicago Hardware Foundry Co., as treasurer of the National Foundry Association.

MOVES FOUNDRY: Cleveland Mfg. Brass Co. shortly will move from the site it has occupied in Cleveland for 65 years to a 50,000-sq-ft plant of the former Glauber Brass Co. in Kinsman, Ohio. The Glauber plant was closed several years ago. It will be remodeled to provide a modern foundry.

MALLEABLE CONFERENCE: Practical operating problems will be discussed at the Technical and Operating Conference to be held by the Malleable Founders' Society at Wade Park Manor, Cleveland, Feb. 7-8. General topics to be covered include: Malleable Melting, Core Materials and Production, Stress Analysis Use, Casting Inspection and Dimensional Tolerance, Pearlitic Malleable Production and Use, Nodular Iron, and Scrap Reduction.

OBITUARY: J. H. Redhead, 76, former president of Lake City Malleable Co., Cleveland, died in Ft. Lauderdale, Fla., Jan. 22 . . . Harry E. Ladwig, 61, retired works manager of foundries and pattern shops, Allis-Chalmers Mfg. Co., died in Milwaukee, Jan. 21 . . . George E. Long, 70, retired chairman and past president, the Koehring Co., Milwaukee, died there Jan. 21.

MISCELLANY: Eastern Foundry Co., Boyertown, Pa., plans a $100,000 plant expansion program . . . Excellent-management ratings have been awarded by the American Institute of Management to Dayton Malleable Iron Co., American Steel Foundries, American Brake Shoe Co., Lynchburg Foundry Co., United Engineering & Foundry Co., and Aluminum Co. of America . . . Gray iron, malleable and nonferrous foundries showed reductions in their accident frequency rates during the third quarter compared with a year previous, while steel foundries had an increase, the Department of Labor reports.

Prices of Foundry Metals and Coke

(As of Jan. 25, 1957)

FOUNDRY COKE

(Per net ton, f.o.b. ovens)

BEEHIVE	
Connellsville	$17.50-18.50
OVEN	
Birmingham	$27.60
Buffalo	29.50
Detroit	29.50
Erie, Pa.	30.50
Indianapolis	29.75
Kearny, N. J.	30.00
Milwaukee	30.50
Montreal, Que.	31.00
Neville Island (Pittsburgh)	28.25
New England, deld.	30.55
Painesville, O.	30.50
Philadelphia	29.50
St. Louis	31.50
St. Paul	29.75
Swedeland, Pa.	29.50
Terre Haute, Ind.	29.75

PIG IRON

(Per gross ton f.o.b. furnace)

	No. 2 Foundry	Malleable
Birdsboro, Pa.	$65.00	$65.50
Birmingham	59.00	63.00
Buffalo	63.00	63.50
Chicago	63.00	63.00
Cleveland	63.00	63.00
Duluth	63.00	63.00
Erie, Pa.	63.00	63.00
Everett, Mass.	65.00	65.50
Fontana, Calif.	71.00	....
Geneva, Utah	63.00	....
Granite City, Ill.	64.90	65.40
Lone Star, Tex.	59.00	....
Neville Island (Pittsburgh)	63.00	63.00
Swedeland, Pa.	65.00	65.50
Toledo, O.	63.00	63.00
Troy, N. Y.	65.00	65.50
Youngstown, O.	....	63.00

NONFERROUS INGOT

(Cents per pound, carlots)

BRASS AND BRONZE: Red brass, No. 115, 35.00; tin bronze, No. 225, 46.00; No. 245, 41.50; high-leaded tin bronze, No. 305, 38.50; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 30.75.

ALUMINUM: 99 per cent plus primary ingots 27.10. Secondary No. 12 alloy 23.00-23.50. Deoxidizing grades: No. 1 23.50; No. 4 20.75.

MAGNESIUM: 99.8 per cent notched ingots 36.00, f.o.b. Velasco, Tex. (10,000 lb or more).

COPPER: Electrolytic 36.00, delivered Connecticut valley.

ZINC: High grade 14.85 delivered. Die casting alloy No. 3, 18.00, No. 2, 19.00, delivered.

IRON AND STEEL SCRAP

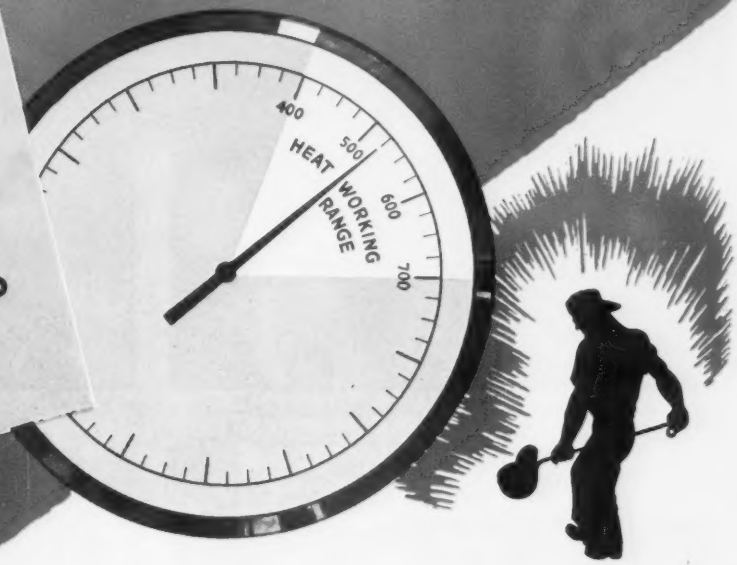
(Consumer prices per gross ton delivered, except as otherwise noted)

	No. 1 Heavy Melting Steel	No. 1 Cupola Cast	Heavy Breakable Cast	Clean Auto Cast	Machinery Cast	Malleable	Short Steel Rails
Birmingham	$46.00-47.00	**$53.00-54.00	.....	.....	.....	.....	$74.00-75.00
Boston*	**50.00-51.50	**44.50-45.50	.....	.....	**45.00-46.00	.....	.....
Buffalo	61.00-62.00	**49.00-50.00	.....	.....	**54.00-55.00	.....	75.00-76.00
Chicago	55.00-59.00	48.00-49.00	.....	53.00-54.00	53.00-54.00	62.00-63.00	76.00-78.00
Cincinnati*	**58.00-59.00	**47.00-48.00	**46.00-47.00	.....	**57.00-58.00	.....	**78.00-79.00
Cleveland	60.00-61.00	57.00-58.00	47.00-48.00	55.00-56.00	59.00-60.00	66.00-67.00	81.00-83.00
Detroit*	**49.00-50.00	**51.00	**44.00	**55.00	.....	**56.00	.....
Los Angeles	54.00	**58.00	.....	.....	.....	.....	.....
New York*	55.00-56.00	46.00-47.00	50.50-51.50	.....	.....	.....	.....
Philadelphia	59.00	54.00-56.00	59.00	.....	60.00-61.00	67.00-68.00	80.00-82.00
Pittsburgh	61.00-62.00	53.00-54.00	50.00-51.00	.....	60.00-61.00	.....	79.00-81.00
St. Louis*	49.00	48.00	42.50	50.50	.....	.....	79.00
San Francisco	59.00	60.00	42.00	60.00	62.00	.....	.....
Seattle	56.00	54.00-56.00	48.00-50.00	.....	.....	.....	.....

*Brokers' buying prices. **F.o.b. shipping point

Whitehead's NEW DUO RESIN* BINDER

● with controlled oven temperature you can profit by the advantages of our latest lab development.



After three years of laboratory research and field testing, Whitehead is now ready to supply DUO RESIN Binder to progressive foundries for dry sand molding. It is a laboratory controlled product designed to replace pitch. DUO RESIN Binder affords all the desirable properties of pitch; in addition, it gives a consistently strong bond and offers the following highly desired advantages:

1. **EASY SHAKEOUT** — DUO RESIN Binder makes shakeout easy because it burns out while metal is cooling.
2. **BETTER CASTING FINISH** — Permits full benefit of blacking penetration since it does not waterproof sand.
3. **ECONOMICAL** — Promotes economy by saving up to 50% of dry binder, requiring less handling, less storage, less transportation. Takes lower baking temperatures, saving fuel, too.
4. **SIMPLIFIES OPERATION** — Because it eliminates need of blending with other compounds to achieve the desired results.
5. **NON-IRRITATING** — Of bland chemical composition, DUO RESIN is non-irritating.
6. **TESTED AND PROVED** — It has been tested and proved safe in foundry after foundry.

Try DUO RESIN Binder!
Order a trial quantity today.

****For details ask for literature or consult our representative.***

Whitehead Brothers COMPANY

Established 1841

NEW YORK OFFICE
324 West 23rd St., New York 11, N. Y.

NEW ENGLAND OFFICE
17 Exchange Place, Providence 1, R. I.

Manufacturers of:

LYQUAGRIP
Ready-to-use core paste

DOB-IT
Ready-to-use core mudding compound

JOINT-SEAL
Plastic compound for perfect sealing

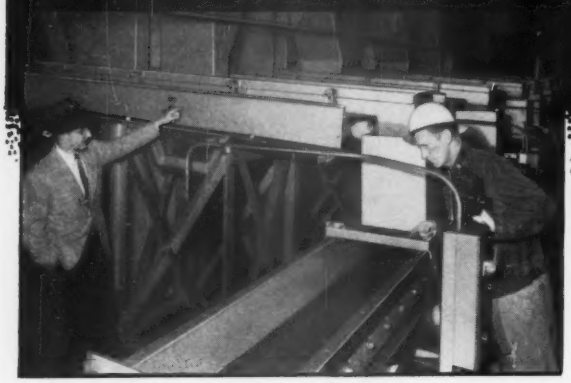
LYQUAFLOUR
For cleaner surface, better shakeout

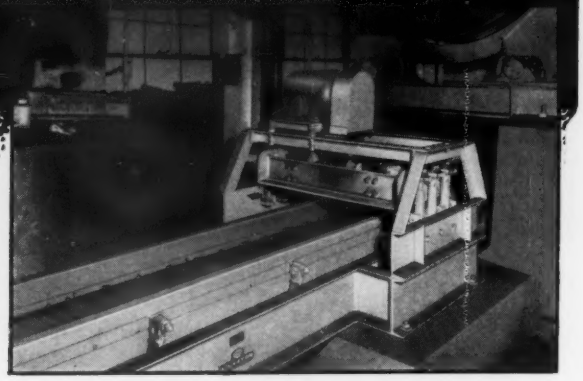
LYQUAFACE
The liquid sand grain coating

Circle 580 on Inquiry Card—Page 209

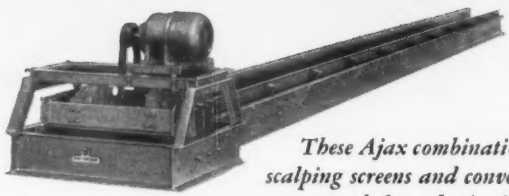
AJAX LO-VEYORS

CUT COSTS OF CONVEYING BULK MATERIALS





One of 60 Ajax Lo-Veyors installed under foundry floor removing sand from shake out stations in large automotive foundry.



These Ajax combination scalping screens and conveyors are used from beginning to end in progressive foundry processes.

● Ajax Lo-Veyors scale, size, separate and screen foundry sand, tramp iron and core wires in one operation while conveying . . . this saves time, space and manpower. Quick removal of foundry sand between progressive processes keeps high speed equipment running at top capacities.

Ajax self-contained Lo-Veyors made in a wide range of sizes and lengths from 3′ up are easily installed...the low head room required for pan and drive unit saves valuable production space in foundries...easily mounted on or under floors or suspended from walls and ceilings.

Dynamically balanced drive unit assures smooth operation of entire unit. Pan and drive unit designed for low power requirements and minimum anchorage. Bearings are splash lubricated and sealed in oiltight case for complete protection from abrasive conditions.

The open type pan has the advantages of simplicity and accessibility. It can be loaded at any point, or several points. The material is always open for inspection. Manually or mechanically operated gates can be provided to shunt material at any one of several points.

Ajax Lo-Veyors are being welcomed as cost saving successors to shovels, wheelbarrows and expensive non-productive labor by custom and high production foundries.

Write today for Ajax Lo-Veyor Bulletin 39

AJAX FLEXIBLE COUPLING CO. INC.

Representatives in Principal Cities

WESTFIELD, N. Y.

pleasurable
to gaze
at....

a pleasure
to use
for cleaning

The finest malleable
shot and grit
on the market

METAL BLAST, INC.

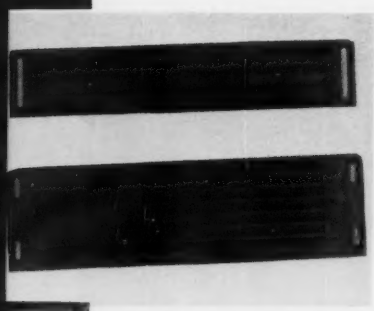
872 EAST 67th STREET • CLEVELAND 3, OHIO

NO. 2F SIMPSON MIX-MULLER doubled sand output and eliminated 20 man hours of work per day when installed in 1950. Now handles week's *requirement* for dry shell sand on Saturday and all molding sand requirements in 12 hour daily work schedule.

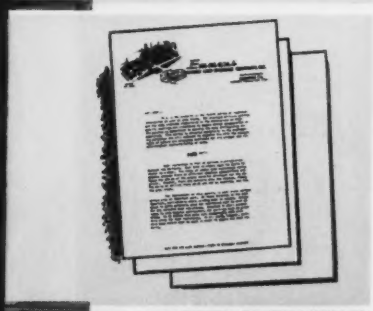
FOUNDRY COMPANY **SELLS JOBBING CAPACITY ON AND SERVICE . . .**

. . . "the dependability of operation and versatility of high grade sand turned out by these two mixers contribute greatly to our ability to fill our customers' casting requirements."

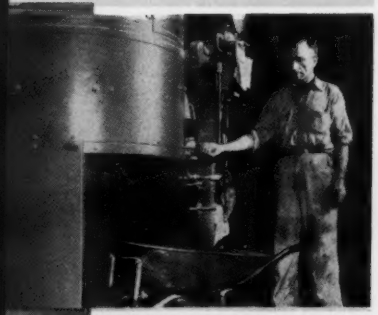
W. S. Thomas, Vice President Emmaus Foundry Company.



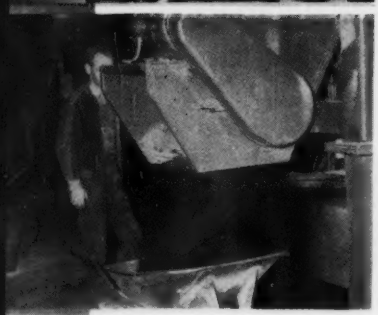
CLOSE SAND CONTROL required by Emmaus is typified by these Jacquard Knitting Machine grids cast in green sand.



TO MERCHANDISE Foundry capabilities and service Emmaus mails out 750 foundry "information" letters to local customers and prospects each month.



NO. 1H MIX-MULLER still works 8 hours a day . . . worked 12 to 18 without single break down for many years, according to operators. Was installed when foundry opened in 1947. Now handles shell core sand mixes.



FLUFFY SAND is delivered to molders through this compact National Aerator. Handles a full batch of highly flowable sand as fast as it is received from mixer discharge.

Progressive Pennsylvania Foundry relies on SIMPSON MIX-MULLERS

In 1947 William S. Thomas opened the doors of Emmaus Foundry Company in Emmaus, Pennsylvania with a firm conviction to produce and *sell* high quality castings in an area where competition is tough.

Nine years and 50 million pounds of castings later, in a prepared speech he said . . . "I have no sympathy whatever for the foundry that sells its products on price alone." A reviewal of Emmaus Foundry Company's major accounts after nine years of operating at 90% to 100% capacity adds weight to Mr. Thomas' comments.

Simpson Mix-Muller has pulled *its* weight with this quality-conscious foundry since the days the doors opened. Until 1950 a 1 Model H Simpson prepared *all* the sand used at Emmaus Foundry. It is still being used eight hours a day on shell and core sands. The Model 2F Simpson Mix-Muller shown at left now handles the payload at Emmaus on weekdays and prepares *a week's requirement* of shell sand on Saturdays. According to Mr. Thomas . . . "the dependability of operation and versatility of high grade sand turned out by these two mixers contribute greatly to our ability to fill our customers' castings requirements."

If *you* operate a Simpson Mix-Muller the Emmaus story may be typical of your own. If you don't—you may be interested in more proof of Simpson superiority. Your man from National *has* it. Ask him to arrange an inspection visit to a Simpson Mix-Muller equipped foundry *near you*. Write for details and remember . . .

Mixing and the integration of mixing facilities is our business.

NATIONAL Engineering Company

646 Machinery Hall Bldg.,

Chicago 6, Illinois

Circle 583 on Inquiry Card—Page 209

JEFFREY puts pig casting on a profitable basis

25-pound lead pigs are cast continuously and automatically ejected by this Jeffrey machine.

Jeffrey pig casting machines put this operation on a straight line basis, automatically emptying the molds after the metal has solidified. Production proceeds at a constant, rapid rate requiring a minimum of labor.

Aluminum, magnesium, lead and brass are among the metals being cast in Jeffrey pig casting machines. Designed to meet each company's exact requirements, they assure that this operation is most profitable.

For help on this or any foundry problem, Jeffrey engineers will assist you in selecting equipment for most efficient performance. The Jeffrey Manufacturing Company, Columbus 16, Ohio.

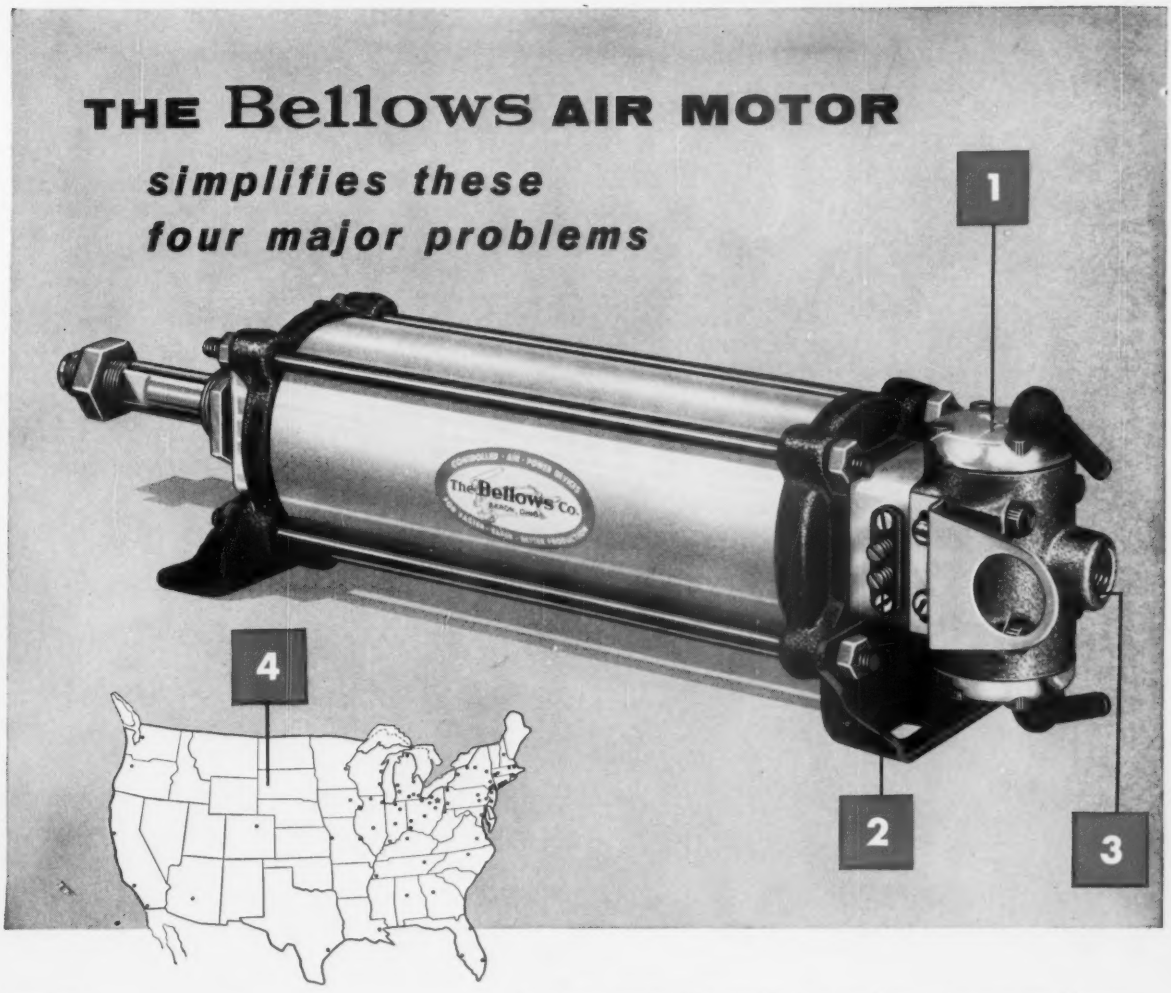
JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT • TRANSMISSION MACHINERY • CONTRACT MANUFACTURING

Circle 584 on Inquiry Card—Page 209

THE Bellows AIR MOTOR

simplifies these four major problems



1 **Built-in electrically controlled directional valve, either 8 or 110 v., simplifies design problems.**

2 **Built-in speed controls for accurate regulation of piston rod speed simplify control problems.**

3 **The single air connection, which can be made with flexible air hose, simplifies installation problems.**

4 **More than 125 Bellows Field Engineers in the United States and Canada simplify service problems.**

Design, control, installation and service are problems every O.E.M. Design Engineer faces when selecting components for automation.

In pneumatic design, the Bellows Air Motor—the air cylinder with the built-in valve—simplifies his problems. Instead of separate valving for directional control, separate valving for speed control, multiple mounting, complex and cumbersome piping for air supply—he works with one compact, complete power unit.

Not only are design and control simplified when you specify "Bellows", but installation costs are less; and you know wherever your machine is shipped, a Bellows Field Engineer will be available for service if it is ever needed.

Write for Bulletin BM-25
"The Story of The Bellows Air Motor"
Address: Dept. FO-257
The Bellows Co., Akron 9, Ohio

The Bellows Co.

AKRON 9, OHIO

644B

In Canada: Bellows Pneumatic Devices of Canada, Ltd., Toronto, Ont.

Working docks of a rail-truck terminal, a powerful Clarklift scoots up a ramp. Said management: "Best demonstration of a fork truck we've seen yet. Even more impressed are the men who drive the trucks . . . and to us that's important."

HERE'S WHAT CHICAGO THINKS OF THE NEW CLARKLIFT

Over 35,000 freight cars roll into Chicago daily; 12,000 trucks deliver to 500 terminals. Within this market place of the nation, thousands of companies are pitting smart business sense against the problem of moving materials at the lowest possible cost. Already many of these companies are benefiting from the new performance standards possible with Clarklift.

Clarklift is exciting news to men whose business is to wrestle with costs. Said one plant engineer: "We know how to *manufacture* on a close margin; we must *handle* material as profitably. From what I've seen, this new Clarklift truck of yours is going to make news about cutting this overhead burden." A company president: "My engineers thought so highly of this Clark truck's possibilities that they asked me to watch a demonstration. At first glance its styling impressed me . . . but after seeing it work, I am doubly impressed by its efficiency of operation."

These are men who are responsible for controlling one of the world's largest concentrations of materials movement. Many of Chicago's progressive companies *know* the Clarklift. How about you? For details call your local Clark dealer, or write us direct.

Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek 16, Michigan

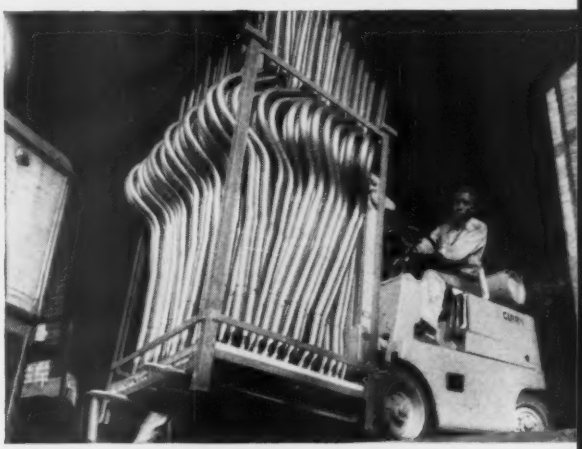
CLARK® EQUIPMENT

CLARKLIFT is a trademark of Clark Equipment Company

(Advertisement)

Clean air cools the engine. Clarklift's exclusive air-scoops work seat high . . . don't pull air off the floor, vacuum-cleaner fashion. Five internal filters and a special radiator screen keep working parts clean—ridding industry of a major problem. Said one foreman: "Biggest problem of a foundry is keeping grit out of working equipment. This Clarklift is the answer."

"This truck is a snap—most accessible I've ever seen. Swing back the hood and you've got the whole motor in front of you. So far I've only done some preventive maintenance, but here's the gimmick; with this truck it's easy."

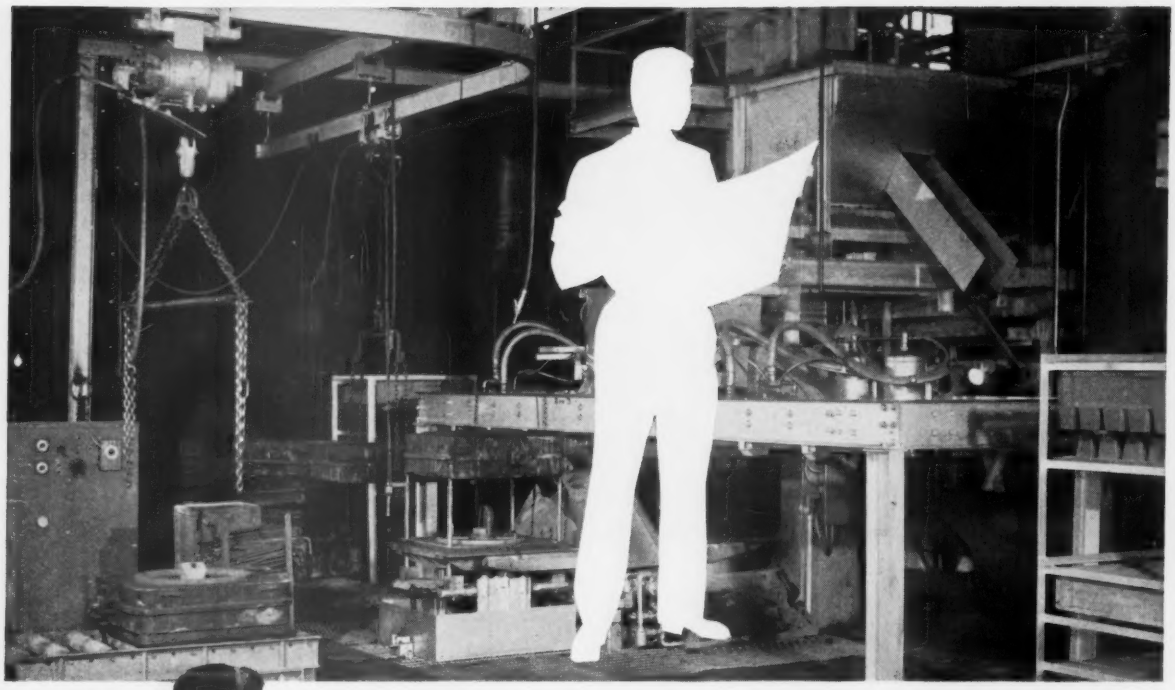


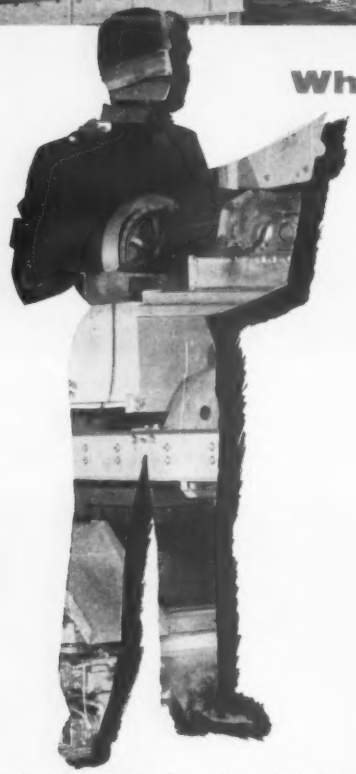
"Close quarter inching, sensitive brakes, good visibility, economy of operation, driver comfort . . . these are important factors which we considered when we bought our Clarklifts," said a plant manager. "We're more than satisfied—are ordering two more."

"Drives like my car. From the size of this truck you might think it was hard to handle. With power brakes, power steering and no clutch pedal—it's a cinch."

"After driving fork trucks for 11 years, I can *feel* the difference. This truck is easier to drive, more comfortable, a lot easier on me. It's not only easier, but I'm getting more work done."

Circle 586 on Inquiry Card—Page 209





Who is your foundry's future?

Stand back for a moment and look at your foundry. Strip it down to its components. What gives it substance?

"Man, of course". you say, "the individual who blends the ingredients into a productive whole."

And it is also upon man that the growth and development of your foundry depend . . . man technically trained and soundly indoctrinated in the field of foundry science and engineering.

But what investment are you making in that man; what are you contributing to his education today, for your greater benefit tomorrow?

Through the efforts of the Foundry Educational Foundation, and its participating members, about two hundred fifty graduate engineers are available to the foundry and allied industries annually. How many will your foundry absorb to insure its future; how many can you claim as a big return on a small investment?

Write today for our detailed booklet, "Let's Look Ahead".

Attend the Foundry Educational Foundation 10th Annual College-Industry Conference • March 13-14, 1957 • Hotel Cleveland, Cleveland, Ohio.

Foundry Educational Foundation

1138 TERMINAL TOWER BUILDING • CLEVELAND 13, OHIO

The Foundry Educational Foundation does not pay for this advertising. This space has been contributed by FOUNDRY magazine in support of FEF's constructive program for foundry industry progress through education.

burg Times Herald

JANUARY 15, 1957

BETTER PRODUCTS SECTION

PHOTO COURTESY AMPCO METAL, INC., MILWAUKEE, WIS.

LITHIUM DE-OXIDIZES HUGE COPPER CASTING

99.8% Conductivity Obtained

MINNEAPOLIS—Special Ampco Metal, Inc., Milwaukee, Wis., obtained high structural soundness and electrical conductivity for the centrifugally cast copper ring (photo above) used in casting aluminum. As-cast weight of the ring was 1800 lbs. Approximate as-cast size is 50″ O.D., 6″ thick.

LESS THAN 1/5 of a pound of metallic lithium added to the melt resulted in a dense, oxygen-free casting minus only .2% of being 100% conductive.

AS LITTLE AS 0.005% (2¼ gram cartridge) refines high temperature copper, brass, bronze, and nickel-silver, producing a sounder, more uniform casting.

THE SALTS of Lithium, Carbonate and Chloride benefit the heat treater by lowering bath melting points.

Is your foundry using Lithium? Our banks of electrolytic cells can supply experimental grams or commercial tons. Send for details of actual foundry tests.

(ADVERTISEMENT)

Lithium Firm Doubles Sales for 9 Months

Lithium Corporation of America, Minneapolis, reported Thursday that in the first nine months of 1956 its net sales were more than double those in the same 1955 period.

Herbert W. Rogers, president, in a report to stockholders, said sales were $8,699,028 in the nine-month period, compared with $4,276,- the same period a year

1956 period ared with

Green Giant to Spend 2½ Millions on Can Plant and Warehouses

at Co., Le Sueur, ed to a 47-per-cent increase Tuesday it net sales a pared ss of

... trends ahead in industrial applications for lithium

LCA LITHIUM CORPORATION OF AMERICA, INC.

2600 RAND TOWER, MINNEAPOLIS 2, MINN.

PROCESSORS OF LITHIUM METAL • METAL DISPERSIONS • METAL DERIVATIVES: Amide • Hydride • Nitride • SALTS: Bromide • Carbonate • Chloride • Hydroxide • SPECIAL COMPOUNDS: Aluminate • Borate • Borosilicate • Cobaltite • Manganite • Molybdate • Silicate • Titanate • Zirconate • Zirconium Silicate

BRANCH SALES OFFICES: New York • Pittsburgh • Chicago • MINES: Keystone, Custer, Hill City, South Dakota • Bessemer City, North Carolina • Cat Lake, Manitoba • Amos Area, Quebec • PLANTS: St. Louis Park, Minnesota • Bessemer City, North Carolina • RESEARCH LABORATORY: St. Louis Park, Minn.

ADAMS ALUMINUM EASY-OFF FLASK

Built for You in Any Length, Width or Depth

Make real savings from these advantages!

RIGID CONSTRUCTION from our proven corner design, permits less weight with no loss of strength.

SOLID CORNERS are of the same design used on Adams Aluminum Slip Flasks. This interlocking tongue-and-groove construction is retained in perfect alignment with bolts secured through tapped end sections and locked with washers and nuts. Important! This construction has proved far superior to other forms of corner design.

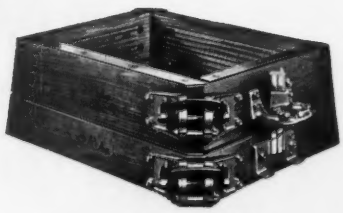
MALLEABLE TRIMMINGS are used on Adams Aluminum Easy-Off Flasks as on all other flasks we manufacture.

OPERATING MECHANISMS are identical with those used on the Adams Cherry Easy-Off Flask and incorporate the same simple adjustment and reversal of locking position.

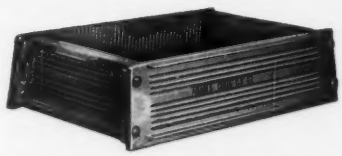
STEEL PROTECTING STRIPS are standard equipment at top of cope and bottom of drag. Aluminum strips available upon request at no extra charge.

HANDLES AND TRUNNIONS are available when specified.

PIN AND EAR ARRANGEMENT available to interchange with present pattern plate guides.



Adams Cherry Easy-Off Flask



Adams Jackets, Cast Iron or Aluminum

Adams Steel Jacket

Write us today for further details . . . Cherry Snap Flasks—Cherry Slip Flasks—Aluminum Slip Flasks—Easy-Off Flasks—Cherry Presser Boards—Wood Bottom Boards—Steel Bottom Plates—Steel Jackets—Aluminum or Cast Iron Jackets—Steel Bands—Steel Upsets—Cherry or Aluminum Upsets

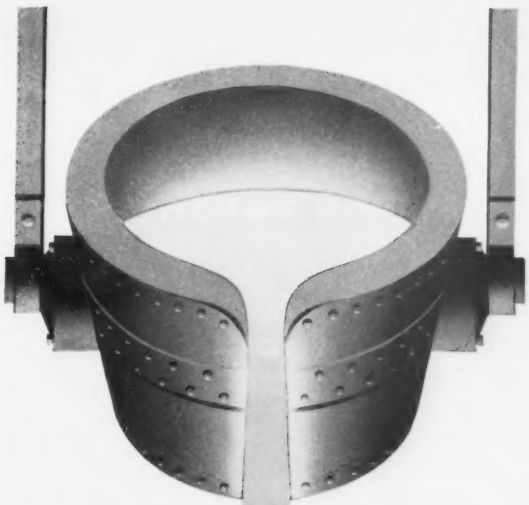
The ADAMS Company

ESTABLISHED 1883

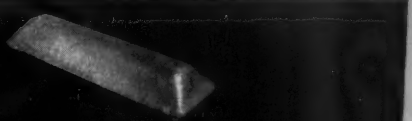
MOLDING MACHINES and FLASK EQUIPMENT

700 FOSTER STREET, DUBUQUE, IOWA, U.S.A.

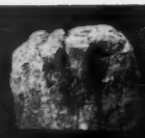
Circle 589 on Inquiry Card—Page 209



Quality Products for the Foundry Trade

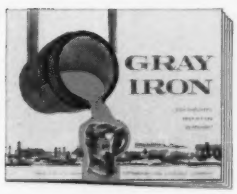


NEVILLE
PIG IRON



NEVILLE
FOUNDRY COKE

Send for Your Copy of This Free
GRAY IRON BROCHURE



An illustrated brochure on the Gray Iron Industry and its place in the nation's industrial economy. Includes descriptive data on casting practices and the story of the production of Neville Pig Iron and Neville Foundry Coke.

COKE & IRON DIVISION
PITTSBURGH
COKE & CHEMICAL CO.
Grant Building • Pittsburgh 19, Pa.

WSW 6394

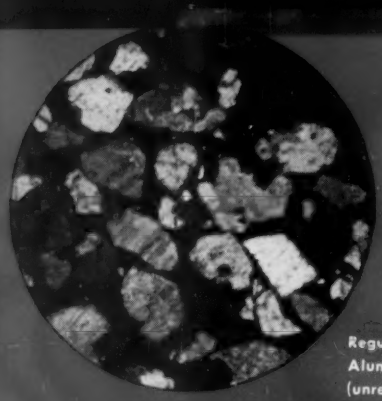
COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

NEW in toughness

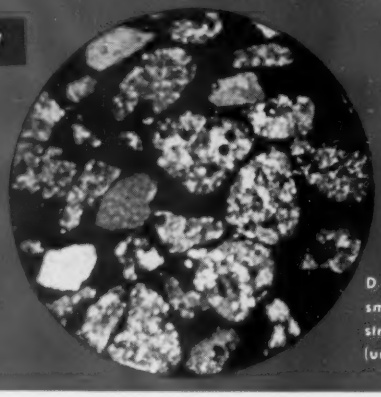
NEW in cutting action

NEW in grinding economy

NEW



Regular Aluminum Oxide (unretouched)



D A Borolon smaller crystal structure (unretouched)

SIMONDS

DA Borolon® TRADE MARK

for resinoid bonded snagging wheels

A big forward step to new efficiency in grinding steel mill billets and foundry castings. Note the smaller crystalline structure of DA Borolon within each abrasive cutting particle! This means inherent toughness to resist fracture during grinding stress . . . more and sharper cutting edges on the wheel face . . . longer, useful wheel life . . . and more production per wheel dollar. Test after test on swing frames, floor stands and portables prove that Simonds wheels with this new aluminum oxide abrasive belong on your grinders for more production at lower cost. Write for descriptive bulletin.

Circle 591 on Inquiry Card—Page 209

NEW LIFE

for more grinding...

SIMONDS ABRASIVE CO.

GRINDING WHEELS

with DA Borolon® TRADE MARK

CALL YOUR SIMONDS DISTRIBUTOR

LOCAL STOCK
FAST SERVICE

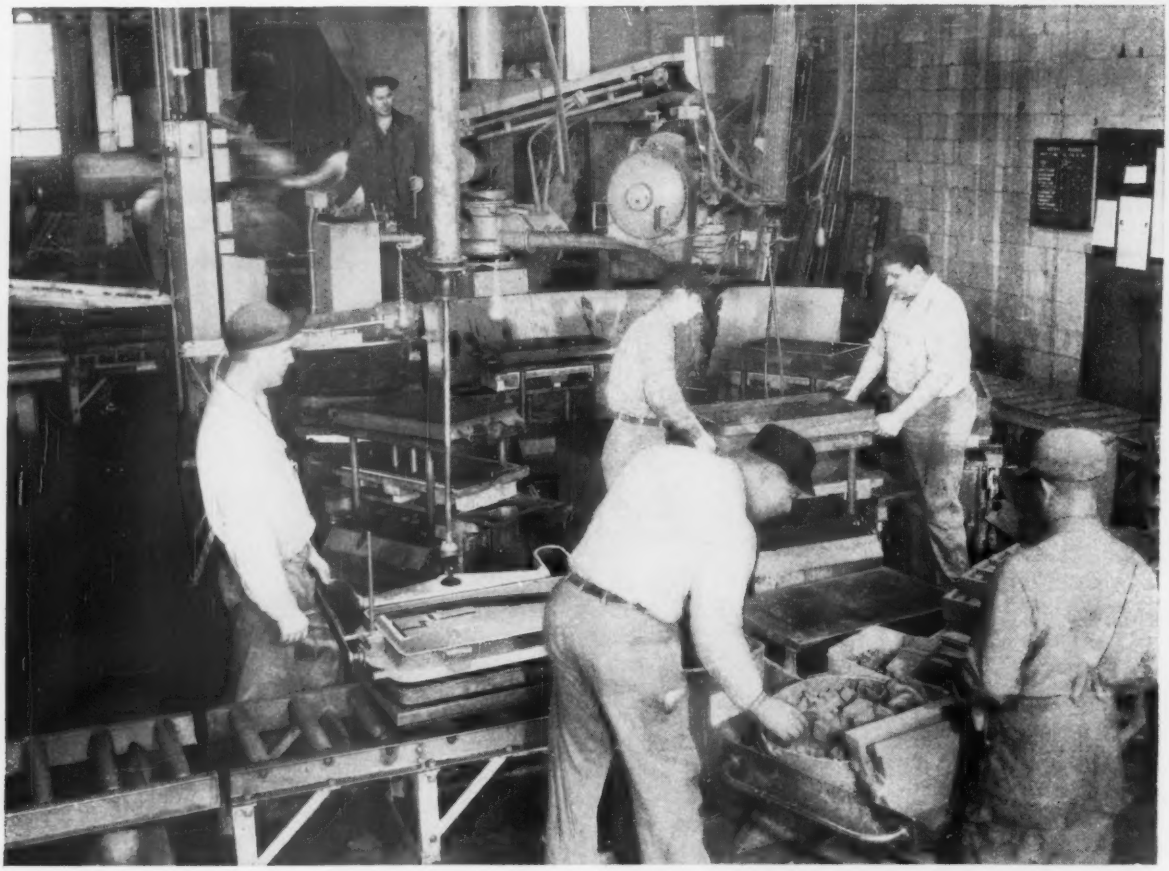
SIMONDS ABRASIVE COMPANY

Tacony & Fraley Sts., Philadelphia 37, Pa.

DIVISION OF SIMONDS SAW AND STEEL CO.

BRANCHES: PHILADELPHIA, CHICAGO, DETROIT, LOS ANGELES, SAN FRANCISCO, PORTLAND, ORE.

There's a slinger unit designed for every job

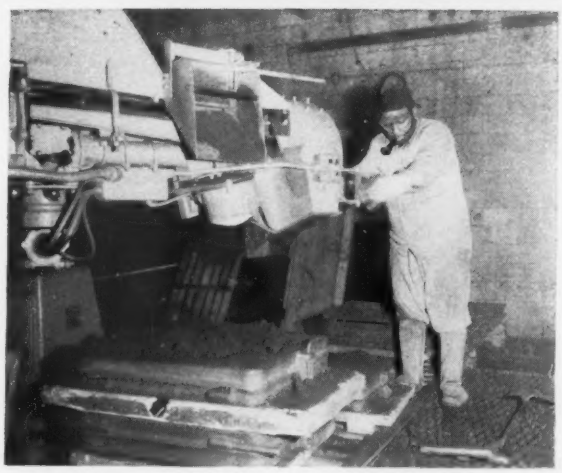


A CASE STUDY at the Detroit Stoker Company, Monroe, Michigan where this Hydra-Slinger Roto-Mold Unit handles many of the foundry's medium size production and semi-production patterns on an efficient production cycle.

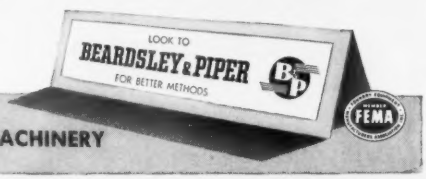
Two efficient molding units—each built around a slinger — have recently been installed at the Detroit Stoker Company, Monroe, Michigan. One unit, with Hydra-Slinger, B & P Roto-Mold turntable and six B & P Speed-Draw Machines, handles the foundry's production and semi-production work. The other unit with Sandslinger and B & P Rol-A-Draw rollover draw machine handles the jobbing work.

Both units are ideally adapted to the range of work handled, and both have contributed greatly to the overall success of this foundry. This plant offers an excellent example of how slinger mechanization can meet greatly varying requirements.

There are slinger units designed for every job—from loose pattern jobbing work to highest production repetitive production work. Bulletin 320 has all of the facts . . . send for your copy today. Beardsley & Piper, 2424 N. Cicero Ave., Chicago 39, Illinois.



LARGER JOBBING WORK at Detroit Stoker is rammed by this Stationary Sandslinger served by roller conveyor. These molds are rolled over and drawn on a B & P 920 RCX Rol-A-Draw rollover draw machine.



THE WORLD'S LARGEST EXCLUSIVE MANUFACTURER OF FOUNDRY MACHINERY

MORGAN ENGINEERING CO., Alliance, Ohio, uses Timken bearings on the idler and driver track wheels of their 50/20-ton capacity overhead traveling cranes to take heavy thrust loads, reduce friction, keep performance up and maintenance down.

Morgan Cranes move hot slabs fast

...TIMKEN® bearings cut traveling costs

THESE Morgan heavy-duty cranes move hot steel slabs from cars to storage in an Eastern steel mill and do it fast. To be sure they keep rolling and at minimum cost, Morgan engineers mounted the idler and driver track wheels on Timken® tapered roller bearings. They keep them on the go with minimum maintenance.

The tapered construction of Timken bearings lets them take *both* radial and thrust loads in any combination. And full line contact between the rollers and races gives Timken bearings *extra* load-carrying capacity. They can take the heavy thrust loads of crane operation in stride. No additional thrust devices are needed. Longer bearing life is assured. Cranes keep rolling.

Timken bearings practically eliminate friction because they are designed by geometrical law to have true rolling motion and are made microscopically accurate to conform to their design. Because friction is reduced wheels and loads roll smoothly. Costly maintenance drops, power is saved.

And by holding housings and shafts concentric, Timken bearings make closures more effective. Dirt and dust stay out; lubricant stays in. Lubricant and upkeep costs are also decreased.

What's more, Timken bearings shrug off shock loads. They're case-carburized to give them hard, wear-resistant surfaces over tough, shock-resistant cores.

Only Timken bearings give you so many advantages. Always specify Timken bearings for the machines you buy or build. Be sure the trademark "Timken" is on every bearing—it's your assurance of full, money-saving value. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

REVOLUTIONARY BUCYRUS PLANT HELPS HOLD DOWN RISING COSTS

At a new plant in Bucyrus, Ohio, the Timken Company has substantially reduced the cost of tapered roller bearings by: 1) producing these bearings under a new system of extreme mechanization; 2) standardizing on 13 bearing sizes with the widest applications throughout industry. Manufacturers can take advantage of these lower costs by redesigning applications to use these Bucyrus sizes. And as more switch to Bucyrus bearings, production costs can drop still further, meaning even lower costs to you.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

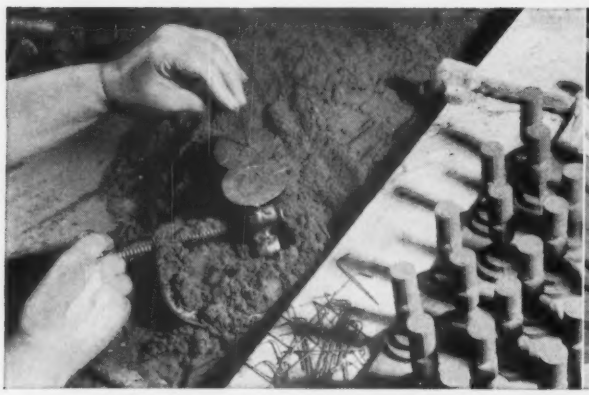
TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◐ AND THRUST ⊣◐⊢ LOADS OR ANY COMBINATION ✳

costly steps you can bypass

● No oven drying is necessary

● No core knock-out problem



● No reinforcing with wires and nails

● No patching operations

. . . with shell cores bonded with DUREZ 18250 RESIN

SHARPLY REDUCED COSTS in mass production of high-grade castings result from simpler procedures made possible by Durez 18250 phenolic resin for cold coating sand.

Operations started in a corner soon mushroom into profit-making business, crying for extra space.

This is what happened at the Marsh Valve Company, Dunkirk, New York. Labor and material costs were reduced and production rate was increased. Core driers and conventional oven baking operations were eliminated. Core setting was faster. Breakage due to handling was negligible. Wire or nail reinforcing and patching were no longer necessary. The shell cores were much lighter in weight; for example, one valve body core made with conventional core sand weighed 9 oz. versus 4 oz. for a corresponding shell core. Considerable savings were also evident in a faster and cleaner shell core shake-out.

Shells and cores bonded with Durez 18250 have good hot and cold strength. More economical resin-to-sand ratios can be used, while the fast cure of the resin means shorter production cycles. Resultant castings exhibit pattern-like surfaces with clean, sharp edges.

Order a trial shipment today, and let us show you how Durez 18250 cuts costly steps.

We will gladly send you our authoritative 16-page booklet covering simplified procedure, coating methods, solvents, test methods, etc. Ask for the "Durez Guide to Resin Coated Sand."

DUREZ®

Phenolic Resins that Fit the Job

DUREZ PLASTICS DIVISION

HOOKER ELECTROCHEMICAL COMPANY

1002 WALCK ROAD, NORTH TONAWANDA, N. Y.

HOOKER® CHEMICALS PLASTICS

Grinds 33% faster

...increases wheel life

● *More power per pound* is the reason why the new *Rotor B-7 Vertical Grinder* does jobs faster. *Application:* Grinding flash and parting lines on cast machine parts. Replaced flexible shaft grinders. *Result:* Boosted output 33%. Savings will pay for the new *Rotor B-7 Vertical Grinders* in 17½ weeks. Operator fatigue is less. Wheels last longer. Downtime now nil.

The nearby Rotor Application Engineer will demonstrate these or other new Rotor Tools on *your* jobs. Write for Bulletin 56 on Rotor Vertical Grinders. The ROTOR TOOL Company, Cleveland 32, Ohio.

Here's the Right TOOL for YOUR job!

Rotor Air Tools: Assembly Tools • Drills • Small Wheel Grinders
Straight Grinders • Vertical Grinders • Scalers • Chippers • Rammers
Rotor High-Cycle Electric Tools: Grinders • Polishers • Sanders

ROTOR TOOLS®
CLEVELAND, OHIO

Circle 595 on Inquiry Card—Page 209

There goes another furnace into the Keokuk "tepee!" The Chief, Princess Wenatchee and Junior are mighty busy preparing for the future. Seriously, big things are going on at both our Keokuk and Wenatchee plants. Demands for Keokuk Silvery Pig Iron, silicon metals—other ferroalloys have been considerable (we are happy to say) and this calls for 2½ million dollars worth of expansion and modernization. In fact, we are now installing several huge ferro-alloy electric furnaces, one of which, we believe, is the largest of its kind ever to be built. This will provide added capacity and along with new materials handling systems and other types of equipment, continued efficiency, quality of product and prompt service will be assured. This, we feel sure, is of interest to all our customers.

KEOKUK ELECTRO-METALS COMPANY

Keokuk, Iowa
Wenatchee Division, Wenatchee, Washington

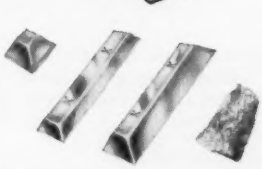
KEOKUK SILVERY PIG IRON

SILICON METAL—OTHER FERROALLOYS

SALES AGENT: MILLER AND COMPANY

332 S. Michigan Ave., Chicago 4, Illinois
3504 Carew Tower, Cincinnati 2, Ohio
8230 Forsyth Blvd., St. Louis 24, Missouri

Keokuk Silvery Pig is the superior form of silicon introduction for foundries and steel plants. Car for car and pig for pig, it never varies in quality or content. Keokuk can be handled by magnet and charged by weight or piglet count. Available in 60 pound and 30 pound pigs and 12½ pound piglets. Leading aluminum producers specify Keokuk Silicon Metal for uniform high purity.



SHOW ME YOUR TOUGH LIFTING JOBS!

Here's the hoist to handle them in a hurry. It's the 'Budgit' Aluminum Chain Block. Talk about easy pull; this hoist really has it. One man can lift a 500 lb. load with only 25 lbs. of muscle effort. The ½-ton size weighs only 29 lbs. Easy to carry anywhere a fast lift is needed.

The 'Budgit' Aluminum Chain Block takes hard knocks because super-strength is built into every part from top hook to load hook. Extra safety and efficiency is provided by the big "full jeweled" load brake. It's a fast-acting, automatic brake that makes lowering so smooth and easy loads can be "spotted" with hairline accuracy.

Put the money-saving advantages of the 'Budgit' Aluminum Chain Block to work for you. Spark-resistant models are available for use where such a safeguard is essential. Capacities: ¼ to 10 tons. *Call your nearby "Shaw-Box" Distributor for details or write us for Bulletins 405 and 415.*

I-Beam Trolleys, equipped with ball bearing wheels are available in standard and spark-resistant designs. Plain and hand geared types. Capacities to 20 tons.

Safety Hooks are available to "lock in" slings and other attachments used to support loads. All capacities.

Carrying Case. Heavy canvas riveted to sturdy base plate. Has zipper and leather handle. For 'Budgit' Aluminum Chain Blocks up to 1 ton.

57C-4

MAXWELL MANNING M&M & MOORE INC. TRADE MARK

'Budgit'® CHAIN BLOCKS

MANNING, MAXWELL & MOORE, INC.

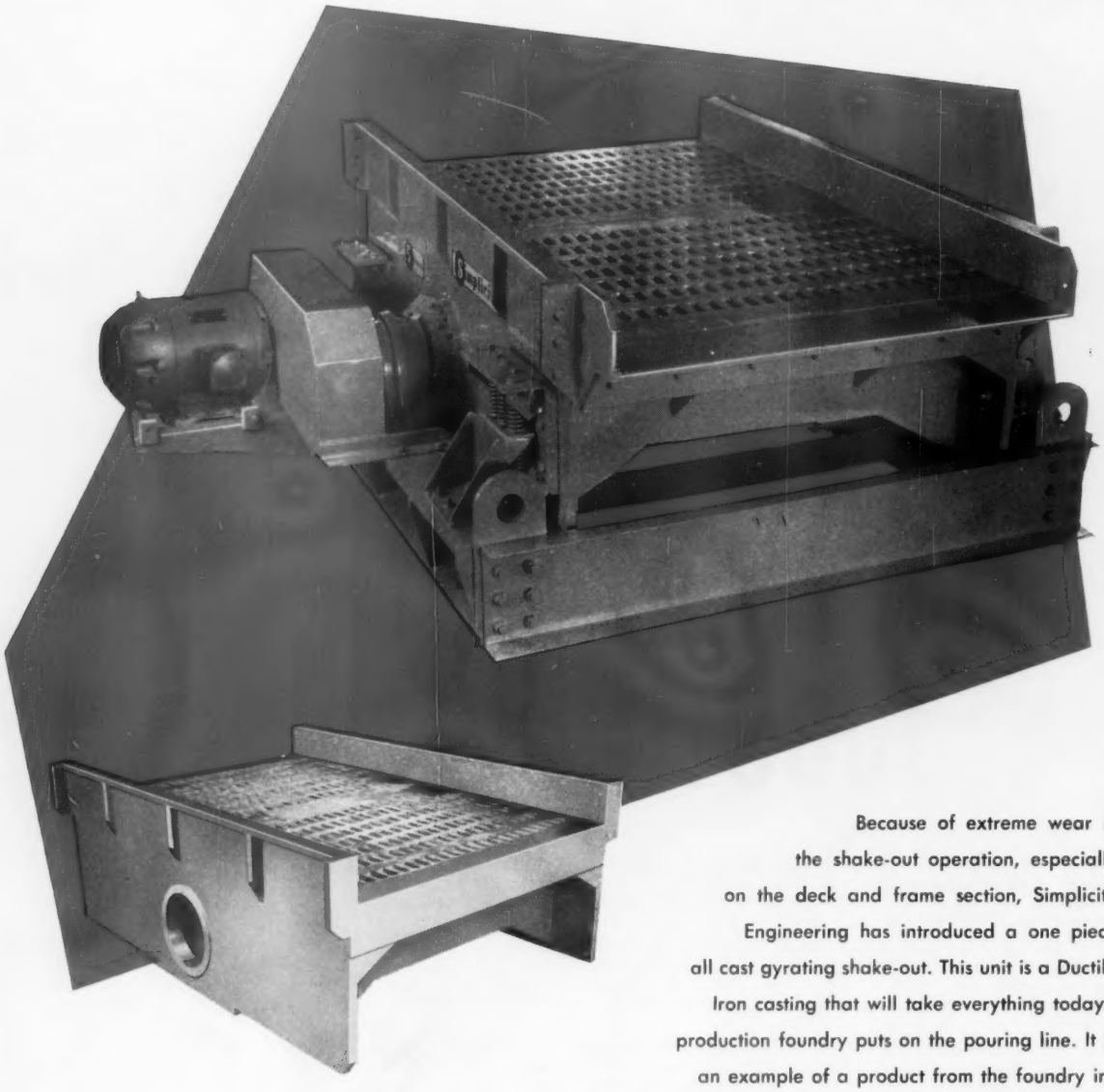
SHAW-BOX CRANE & HOIST DIVISION

386 West Broadway • Muskegon, Michigan

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Other Divisions produce 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

In Canada: *Manning, Maxwell & Moore of Canada, Ltd., Avenue Road, Galt, Ontario*

ONE PIECE SIMPLICITY CAST GYRATING AND LOWER MAINTENANCE FOR THE



Because of extreme wear in the shake-out operation, especially on the deck and frame section, Simplicity Engineering has introduced a one piece all cast gyrating shake-out. This unit is a Ductile Iron casting that will take everything today's production foundry puts on the pouring line. It is an example of a product from the foundry industry, for the foundry industry. Cast by The Beloit Foundry Company, Beloit, Wisconsin, it has no rivets or welds, nothing to shear or work apart. Maintenance and wear are at an absolute minimum and this casting makes the all cast shake-out the quietest operating unit in the foundry industry today. This casting, as well as many other cast parts, in all Simplicity shake-outs, makes long life a built-in feature of this equipment. You'll find high performance in any shake-out manufactured by Simplicity, for over 30 years the standard in foundry equipment.

This 4' x 6' all cast shake-out is in operation at a large automotive foundry. The unit is handling 240 head castings per hour at temperatures just below molten. You'll find this punishing schedule an everyday job for thousands of Simplicity shake-outs throughout the foundry Industry.

179

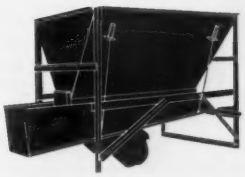
SHAKE-OUTS MEAN LONGER WEAR FOUNDRY INDUSTRY

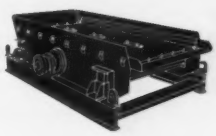
under side view cast shake-out

A view of the under side of the all cast shake-out showing the reinforcing ribs that give this unit extra strength for long, tough operation. Simplicity also recently introduced the use of a one piece cast steel grid, replacing perforated plates on heavy duty fabricated shake-outs. This is another casting application for use in the foundry industry.

Simplicity equipment that speeds production

In addition to Shake-Outs, Simplicity also supplies the foundry industry with many other widely-used types of equipment, including screens, feeders, conveyors, lump crushers, and sand conditioning units ● Simplicity Sand Screens help produce better castings by eliminating particles of coke, rock, shot, and other such impurities from your molding sand ● Simplicity Gyrating Screens also help to open up, fluff, and aerate the sand, and to improve grain distribution ● Simplicity Os-A-Veyor Feeders are ideal for delivering a controlled flow of material, either on a continuous basis, or in predetermined amounts ● Bin-hung Os-A-Veyor Feeders will measure coke accurately into charge buckets for the cupola, and other bin-hung or main-frame-supported units are extensively used for conveying sand and limestone ● Also available are single, double, and heavy-duty pan conveyors for sand, and grid-deck conveyors for castings ● Simplicity Lump Crushing units and Sand Conditioning equipment are valuable additions to any foundry . . . assuring the proper sand permeability which is so important to good molding ● All Simplicity equipment is designed for hard wear and long service. Send for our catalog or for any specific information you may need.





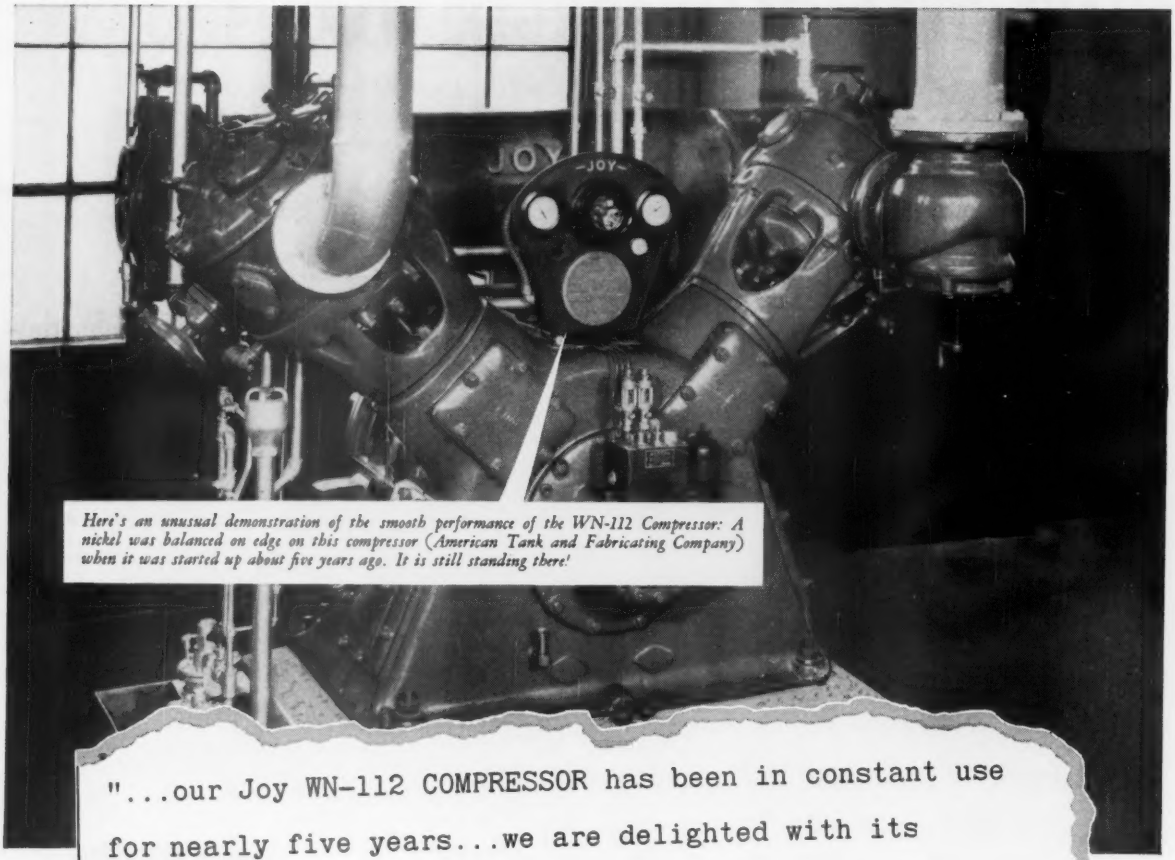
Simplicity
TRADE MARK REGISTERED
ENGINEERING COMPANY • DURAND 7, MICHIGAN

SALES REPRESENTATIVES IN ALL PARTS OF THE U.S.A.

FOR CANADA: Simplicity Materials Handling Limited, Guelph, Ontario

FOR EXPORT: Brown and Sites, 50 Church St., New York 7, N. Y.

Circle 598 on Inquiry Card—Page 209



Here's an unusual demonstration of the smooth performance of the WN-112 Compressor: A nickel was balanced on edge on this compressor (American Tank and Fabricating Company) when it was started up about five years ago. It is still standing there!

"...our Joy WN-112 COMPRESSOR has been in constant use for nearly five years...we are delighted with its vibrationless performance."

George F. Franck, Vice President
American Tank & Fabricating Company,
Cleveland, Ohio

There's no better story than a satisfied customer—

Write for FREE Bulletin 142-13

A complete 28 page description of the WN-112 Compressor . . . section drawings, specifications and other useful information on heavy-duty compressor design and selection.

Nearly five years of absolutely *trouble-free* service is a performance of merit for any continuous-operation machinery. As a matter of fact, though, many of the original Joy WN-112 Compressors, built *two decades ago,* are still giving dependable service to satisfied owners.

Joy pioneered the use of high-rotation speed in heavy-duty compressors . . . were the first to bring to industry the many advantages of this new concept. The V-vertical design with flange-mounted motor resulted in a *compact*, heavy-duty continuous-service compressor that minimized vibration and paid off in trouble-free air power for industrial plants everywhere.

For more information, write **Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.** In Canada: *Joy Manufacturing Co. (Canada) Limited, Galt, Ontario.*

WSW 18412-142

Consult a Joy Engineer

For Air and Gas Compressors,
Vacuum Pumps and Boosters,
Conveyors, Fans, Electrical Connectors

JOY

SPECIALISTS IN THE COMPRESSION AND MOVEMENT OF AIR AND GASES SINCE 1885

Circle 599 on Inquiry Card—Page 209

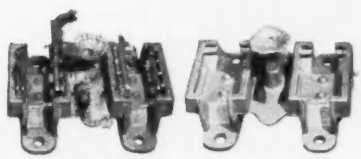
WHEELABRATOR® STEEL SHOT

Plays a Vital Part in Slashing Cleaning Costs in Thousands of Foundries Everywhere

STEEL FOUNDRY CUTS ABRASIVE COST OVER 50%

Walter Berg, Maintenance Supt. of Unitcast Corp., Toledo, reports that they were able to cut abrasive costs from $1.40 per ton of castings cleaned to 60c, a saving of more than 50%, by switching to Wheelabrator Steel Shot.

This is a savings of more than $10,000 a year in shot costs alone. Additional savings accrue in greatly reduced parts wear and maintenance time. Unitcast cleans alloy steel castings such as those pictured below.



Before Cleaning After Cleaning

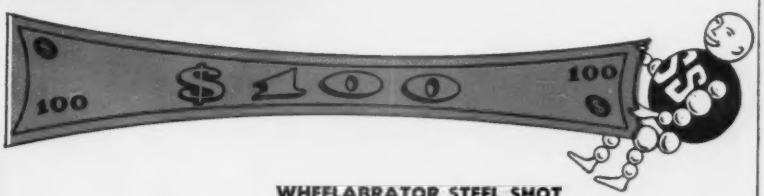
Get ALL the Facts

about Wheelabrator Steel Shot . . . the abrasive to which over 1,000 plants have changed in the past 2 years. Ask for Bulletin 89-B

$100 Does The Work of $229 When Wheelabrator Steel Shot is Used

ORDINARY ABRASIVE

Cleaned 65 tons of gray iron castings for $100 in abrasive costs.



WHEELABRATOR STEEL SHOT

Cleans 149 tons of castings for $100. To clean 149 tons with the ordinary abrasive previously used cost $229.

Multiple savings were effected at Swayne, Robinson & Co., Richmond, Ind., a gray iron foundry, by converting from ordinary abrasive to Wheelabrator Steel Shot. Abrasive costs were slashed from $1.54 to 67c per ton of castings cleaned — a reduction of 57%. In addition, the general foreman reports, "The wear on our Wheelabrator has been greatly reduced, effecting savings in replacement parts and maintenance labor." Cleaning time has also been reduced —from 7 hours daily to only 4 hours.

Greater Productivity At Less Cost

Wheelabrator Steel Shot, made of heat treated electric furnace steel, is the finest blasting abrasive ever developed. It has the hardness for faster cleaning, the toughness and solidity for longer life; it rebounds for greater coverage; it is always round for low maintenance costs; has a warranted quality for uniform results; and gives performance for lowest overall cleaning costs. Examples of its top flight performance:

	Savings in Abrasive Costs
An Ohio steel foundry	60%
A gray iron valve foundry	40%
An Eastern malleable foundry	38%
A St. Louis steel foundry	51%
A Cleveland gray iron foundry	46%

SAVES 23% ON SHOT COST IN CLEANING ANNEALED STEEL CASTINGS

Crucible Steel Casting Company of Milwaukee cleans large steel castings after heat treating. With ordinary abrasives, the cost per wheel hour was $1.57. With Wheelabrator Steel Shot, the cost per wheel hour has dropped to only $1.215, a saving of 23%. With 10 wheels in the plant blasting 10 hours a day, annual savings in shot cost are estimated at $8,000.

WHEELABRATOR
CORPORATION
505 S. Byrkit Street, Mishawaka, Indiana
World's largest manufacturers of Steel Shot

Circle 600 on Inquiry Card—Page 209

Make this simple test!

Convince yourself!

Something new has been added . . . to help you prove through comparative tests that Louthan Refractory Strainer Cores will save you money. If you are still making and using *sand* cores, your savings can be really substantial—through cutting scrap losses in castings and reducing "rework" costs.

Louthan Refractory Cores keep slag and sand-core inclusions out of castings, and permit closer control of the molten metal. They withstand 3000° F. temperatures without spalling or disintegrating. You'll also find them exceptionally uniform, dimensionally accurate, easy to handle, simple and economical to use.

To help you make comparative tests in *your* plant, under normal production conditions, we now have *core prints* of our standard strainer cores which can be easily attached to your patterns. We'll be happy to *give* you these and a reasonable quantity of the matching strainer cores. Simply tell us your sprue diameter (or ingate size) and we'll send them to you. Your only obligation is to *try* them and judge the results for yourself!

WRITE FOR
FREE SAMPLES
AND MATCHING
CORE PRINTS

Louthan **REFRACTORY STRAINER CORES**

Louthan Mfg. Co., East Liverpool, Ohio (Subsidiary of FERRO Corporation)

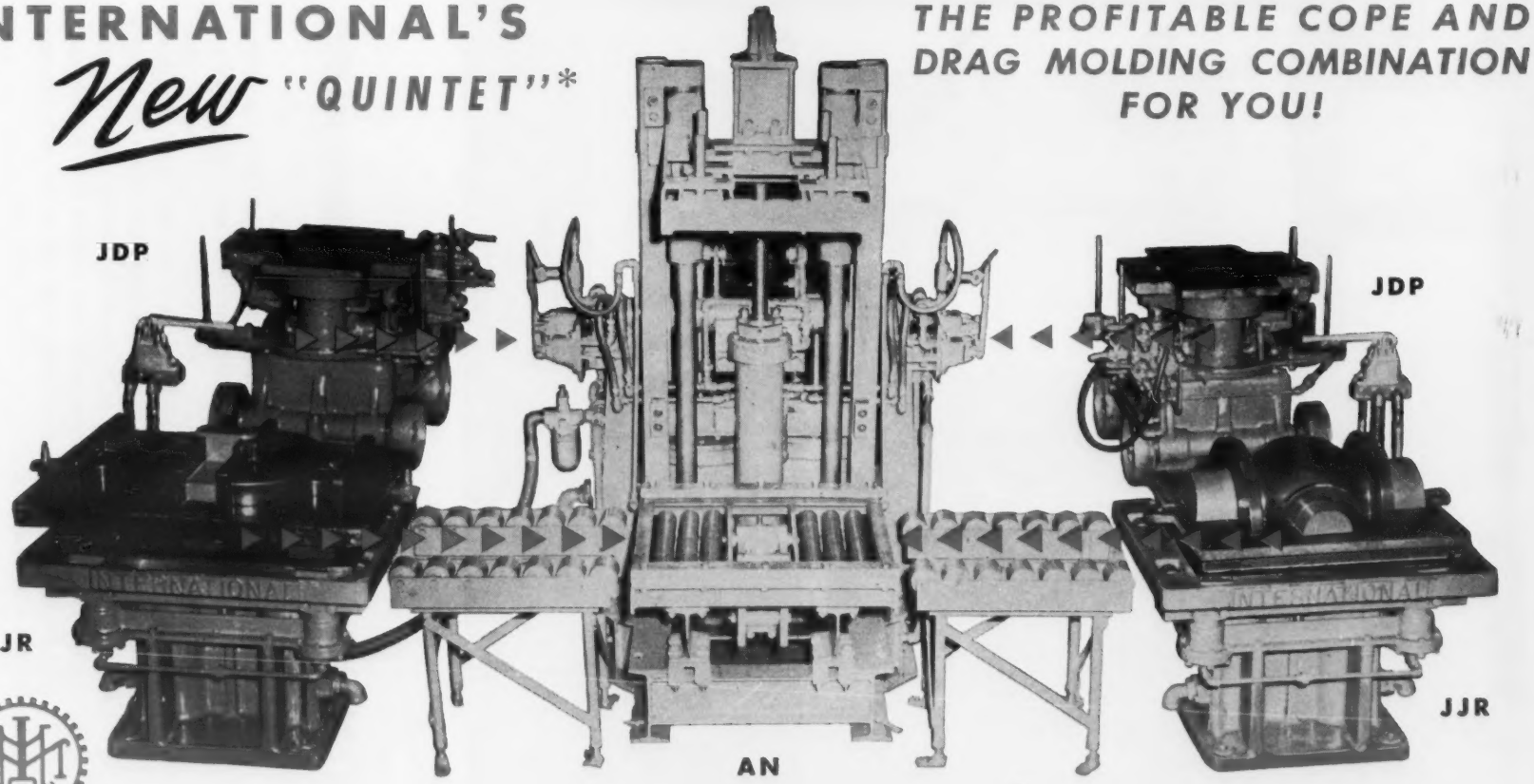
REPRESENTATIVES: M. A. BELL COMPANY, St. Louis 2, Mo. . . . Houston 3, Texas; **FOUNDRY SUPPLY COMPANY,** Minneapolis 16, Minn.; **MILWAUKEE CHAPLET & SUPPLY CORP.,** Milwaukee 46, Wisc. . . . **FREDERIC B. STEVENS INC.,** Detroit 16, Mich. . . . Indianapolis 7, Ind. . . . Buffalo, N. Y.

Circle 601 on Inquiry Card—Page 209

Circle 602 on Inquiry Card—Page 209→

INTERNATIONAL'S *New* "QUINTET"*

THE PROFITABLE COPE AND DRAG MOLDING COMBINATION FOR YOU!



JJR—DOUBLE JOLT MACHINE

Has double jolt feature and is sturdily built to give positive ram throughout core or mold. Jolt capacities range from 750 lbs. to 12,000 lbs.

JDP—COPE MACHINE

Adaptable to large range of work suitable to pin lift style and readily adjustable. Exclusive feature is its positive jolt and true ram accomplished by use of double jolt section combined in one integral part. Will handle loads from 750 lbs. to 3000 lbs.

AN—TURNOVER and DRAWING MACHINE

For clamping and turning over core boxes or flasks and for drawing the core or mold. Easily handles hard-to-draw, short runs and many different sized jobs. No rigging time is required. Capacity—750 lbs. to 10,000 lbs.

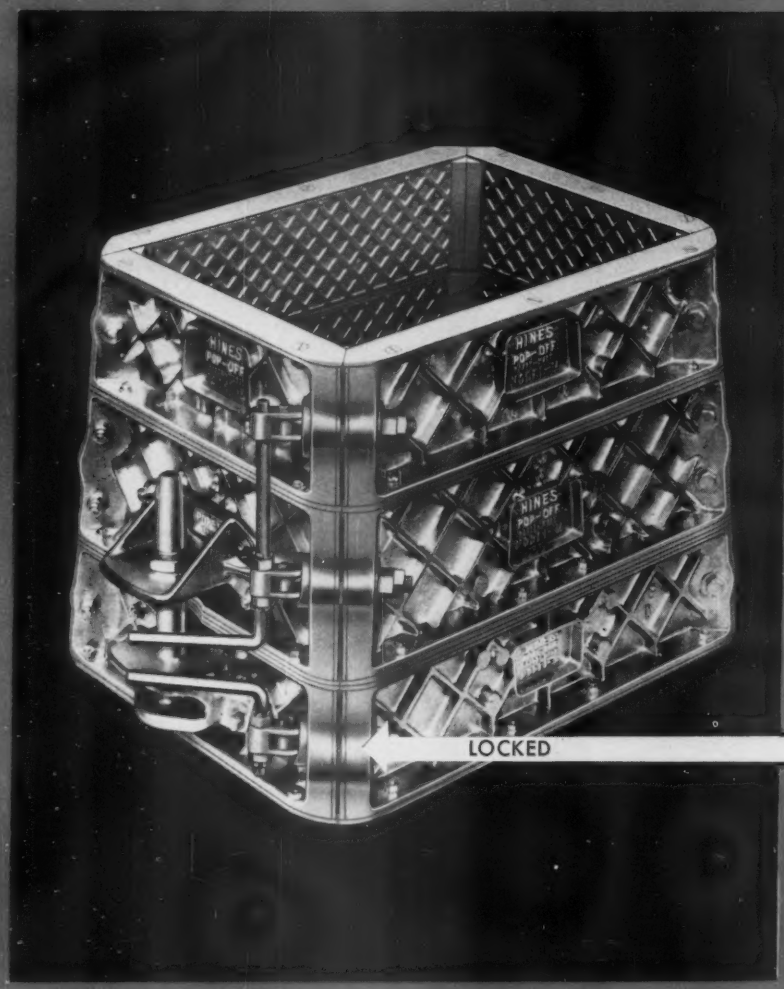
A GROUP OF WORKING INTERNATIONALS

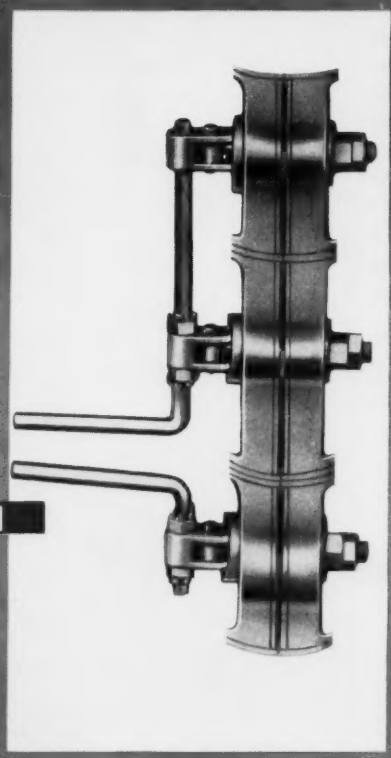
These individual machines are in combination to give you a complete cope and drag molding setup for both short and long production runs.

Investigate International's New Working Quintet Today! Just write us a note telling your cope and drag sizes, and our engineers will plan the best combination for your particular needs. NO OBLIGATION!

*International's System, illustrated by the "Quintet" shows just one of the many possible combinations.

INTERNATIONAL MOLDING MACHINE CO.
LA GRANGE PARK, ILLINOIS





HINES FLASKS now provide

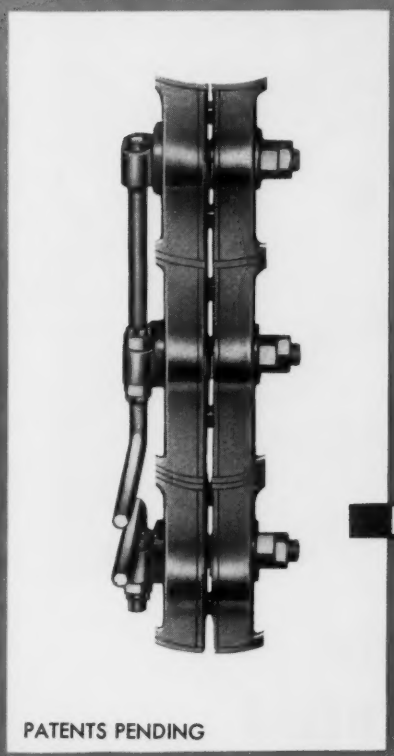
HINES
POP-OFF
FLASK

A new, improved locking mechanism is now available for HINES "POP-OFF" Flasks, to provide for opening two *or more* flask sections *simultaneously.*

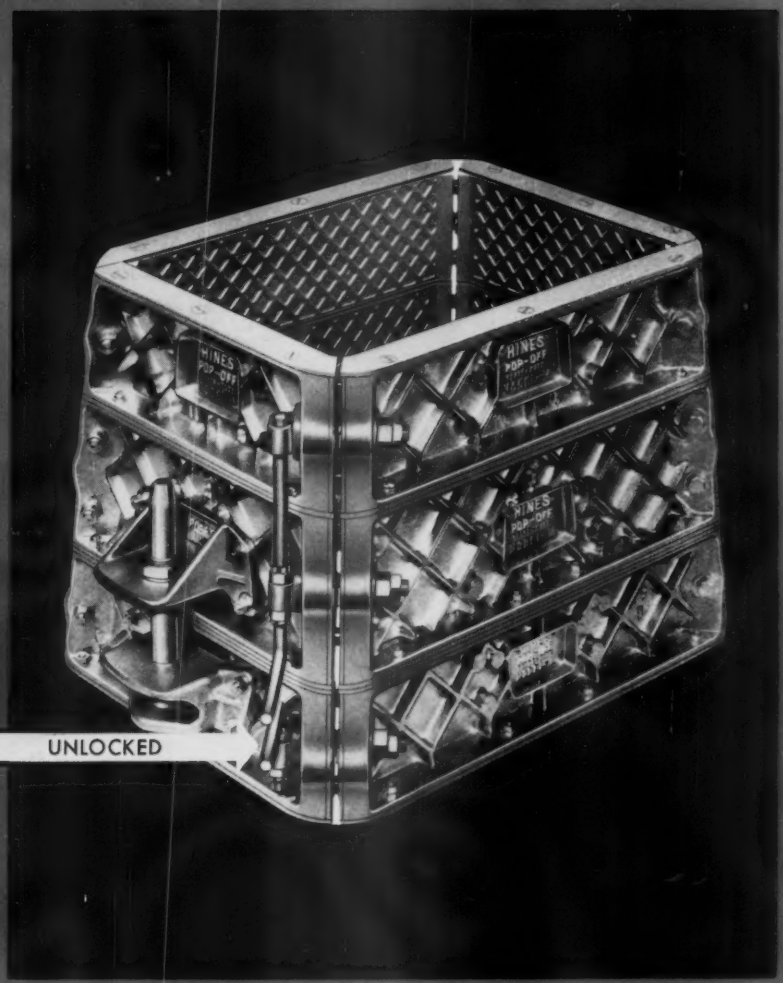
The three-section flask shown above (cope and upset, and drag) when previously equipped with individual levers for each section, required three operations to open each corner. With the new "POP-OFF" mechanism, turning the two control handles, together, unlocks all three sections in a single operation for each corner—quickly and smoothly.

THE HINES

ew



PATENTS PENDING



simultaneous "POP-OFF" action!

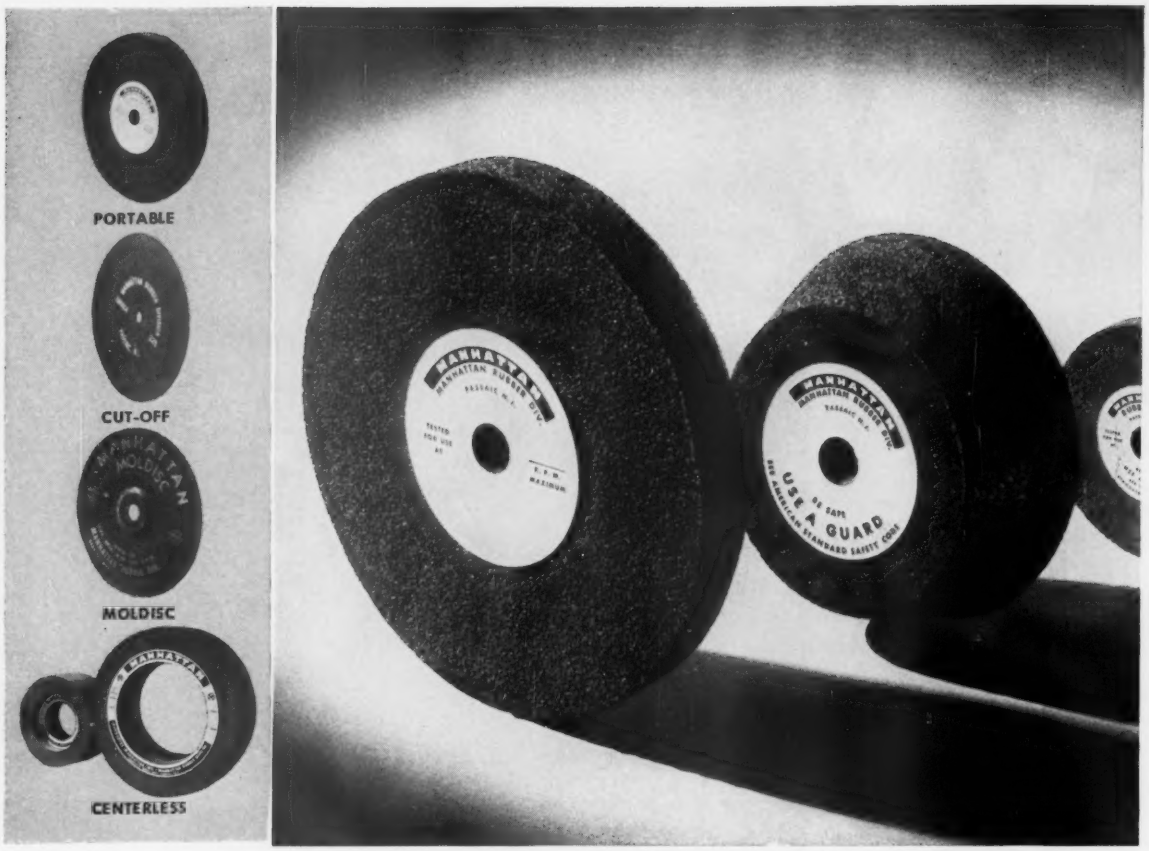
In addition to providing faster operation, this exclusive "POP-OFF" feature eliminates the strain exerted on flask and pins when each section is opened separately. Easier adjustment is obtained, as nuts and lock nuts are merely taken up to compensate for wear. Replacement, too, is a simple matter, if ever necessary.

The new locking mechanism may be obtained on all HINES "POP-OFF" Flasks. When next you're in the market for molding equipment, be sure to consider these new, faster-acting HINES Flasks for better molding—for better castings.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

FLASK CO. 3431 WEST 140th STREET • CLEVELAND 11, OHIO

Circle 603 on Inquiry Card—Page 209



"More Use per Dollar" With MANHATTAN PORTABLE WHEELS

Flared cup, depressed center, cone, plug and mounted point, or straight—there's a Manhattan Portable Wheel to remove *more* metal, *faster*, at *lower* cost on your job. That's because every specification of the wheels you use—type of abrasive, grain size, hardness, structure, and bond—is determined only after careful analysis of your grinding problems . . . the amount of metal you want to remove, the finish you require. This individual engineering for each customer's job requirements accounts for the success of Manhattan Portable Wheels. Workers prefer them because they get more pieces done. Management prefers them because they assure faster, more uniform quality production . . . and they last longer. Fast cutting action *plus* long wheel life add up to more output per man hour and lower production costs—"More Use per Dollar."

Let a Manhattan abrasive wheel engineer show you how you can boost production and cut costs on *every* job with Manhattan Portable Wheels and other types of high speed, heavy duty abrasive wheels.

RM 748

GRINDING WHEEL INSTITUTE MEMBER

WRITE TO THE ABRASIVE WHEEL DEPARTMENT

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Belts • Hose • Roll Covering • Tank Linings • Industrial Rubber Specialties • Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

THE NET RESULT

OF USING

Smith L-O Core Oil

SOUND, ACCURATE CORES AT LOWEST POSSIBLE COST

With Smith L-O on the job, cores are bound for strength, durability and uniformity . . . thin and thick sections dry rapidly and evenly . . . quick collapsibility makes the shake-out a cleaner operation. Smith L-O core oil's uniform high quality plus the invaluable assistance of the Smith Practical Foundry Serviceman in your area is your assurance of increased productivity and profits. Look first to Smith L-O . . . the name that stands for a service as well as a product.

SMITH REPRESENTATIVES

- ALGONQUIN CHEMICAL CO., INC. Hamburg, Pennsylvania
- FOUNDRIES MATERIALS CO. Coldwater, Michigan
- FOUNDRY SERVICE CO. Birmingham, Alabama
- F. F. SHORTSLEEVE Elmira, New York
- PACIFIC GRAPHITE CO., INC. Los Angeles 22, California
- ST. LOUIS COKE & FOUNDRY SUPPLY CO. St. Louis, Missouri
- BRUCE-CONREAUX CO. INC. Indianapolis 7, Indiana
- WESTERN INDUSTRIAL SUPPLY CO. Portland 14, Oregon
- MALCOLM G. STEVENS Arlington, Massachusetts

Circle 605 on Inquiry Card—Page 209

for MORE and BETTER MOLDS...

you can't beat the MONARCH KWIK-STRIP MECHANICAL CORNER FLASK

actually OPENS and CLOSES with FINGERTIP EASE

Locking handle bolts work directly in a straight line. Handles can be placed in any one of four positions (up and down position shown above). Flask opens, closes and locks with positive straight line action of bolts. Binding on working corner is eliminated. Corner pin guides and springs are completely sealed against sand. All working parts are case hardened and cadmium plated. Draw pins are hard chrome plated, centerless ground and polished for true diameter. Forged and plated guide bushings. Cold Rolled wear strips are standard on top of cope and bottom of drag. Wear strips on parting flanges optional. Sides are flat so flask can be set on edge without danger of tipping.

Send for your copy of our new bulletin featuring Monarch KWIK-STRIP Flasks, Jackets, Upsets and Accessories.

CONSTRUCTION: Precision built from cast aluminum or magnesium. Made with the most modern jigs and fixtures and machine tools to insure accuracy.

COPE AND DRAG SIZES: 12″ width x 4″ depth to 30″ width x 7″ depth; 12″ long x 4″ depth to 30″ long x 7″ depth, in increments of one inch. Upsets available in 1″ x 2″ depths. Standard 4° taper.

Cast aluminum or iron jackets available to fit all flask sizes listed above.

"Another Foundry product by"... NEWAYGO engineering company newaygo, michigan

Coming in May

A timely editorial report to foundrymen . . . .

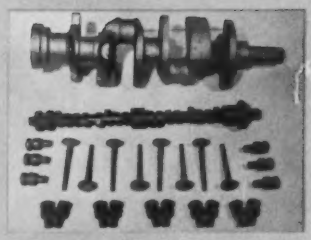
FOUNDRIES CAN SELL MORE CASTINGS

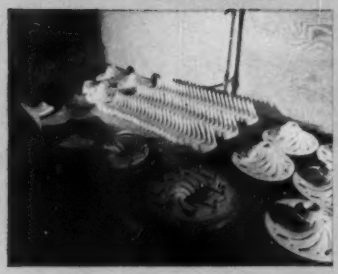
an "IDEA" article in five special sections

The editors of FOUNDRY announce plans for presentation of a thorough discussion of ways and means of selling more castings —a special editorial report being prepared for this year's May Pre-Convention issue. Attention will be given to foundry sales problems in five major areas.

1 MARKET POTENTIALS FOR CASTINGS

In which the editors will discuss and illustrate the long-term trends in market potentials for castings. More particularly they will point to areas where present opportunities occur.



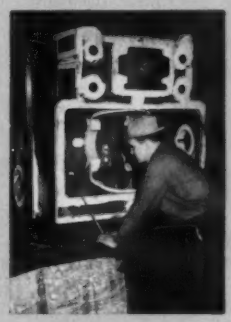


2 HOW NEW TECHNICAL DEVELOPMENTS CAN BE USED TO BOOST CASTING SALES

A study of many new processes, materials and controls presently available for expanding the use and sale of castings.

3 HOW RESEARCH AND PRODUCT DEVELOPMENT CAN SELL CASTINGS

This feature will dramatize and explain ways in which foundrymen can recapture business lost to other fabricating methods and create new applications for castings through conversions.



4 HOW ONE FOUNDRY USED NEW METHODS TO INCREASE SALES

This will be an interesting case study of the manner in which one progressive foundry boosted sales through the aggressive use of new casting developments now available.

5 HOW TO BUILD A MARKETING PROGRAM

This will be a practical approach to the problem of gearing up for selling on a planned basis. It will have values for use by small, medium and large sized foundries.

Look for this special report in the FOUNDRY

MAY 1957 PRE-CONVENTION ISSUE

AFS CASTINGS CONGRESS
and 1st Engineered Castings Show
Cincinnati—May 6 to 10, 1957

61st CASTINGS CONGRESS

and

1st Engineered Castings Show

AMERICAN FOUNDRYMEN'S SOCIETY

Cincinnati, Ohio
May 6 to 10, 1957

FOUNDRY

MAY 1957 PRE-CONVENTION ISSUE

The May Pre-Convention issue of FOUNDRY will be mailed one week earlier than usual to reach foundrymen well in advance of the convention.

FOUNDRIES CAN SELL MORE CASTINGS

A Special Editorial "assist" in five helpful sections.

AFS CASTING CONGRESS

A description of the Technical Program, convention activities and planning for this year's AFS meeting.

FEATURE STORIES AND REGULAR DEPARTMENTS

Regularly scheduled features, Late News, Questions and Answers and other departments will appear as usual.

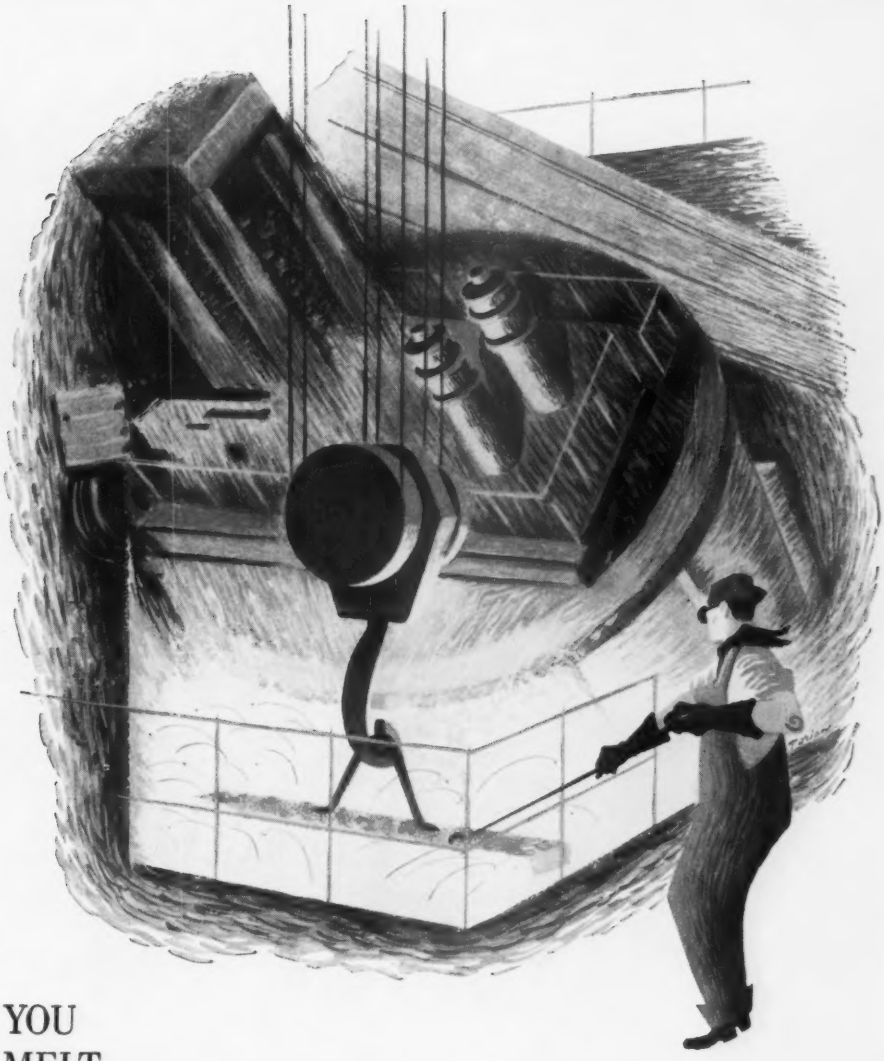
And in June

POST CONVENTION ISSUE . . . .

The news and picture story of the Cincinnati convention and technical sessions will be a special feature of the June Post-Convention issue of FOUNDRY.

FOUNDRY

A PENTON PUBLICATION · PENTON BUILDING · CLEVELAND 13, O.



WHEN YOU
MELT...

Lectromelt

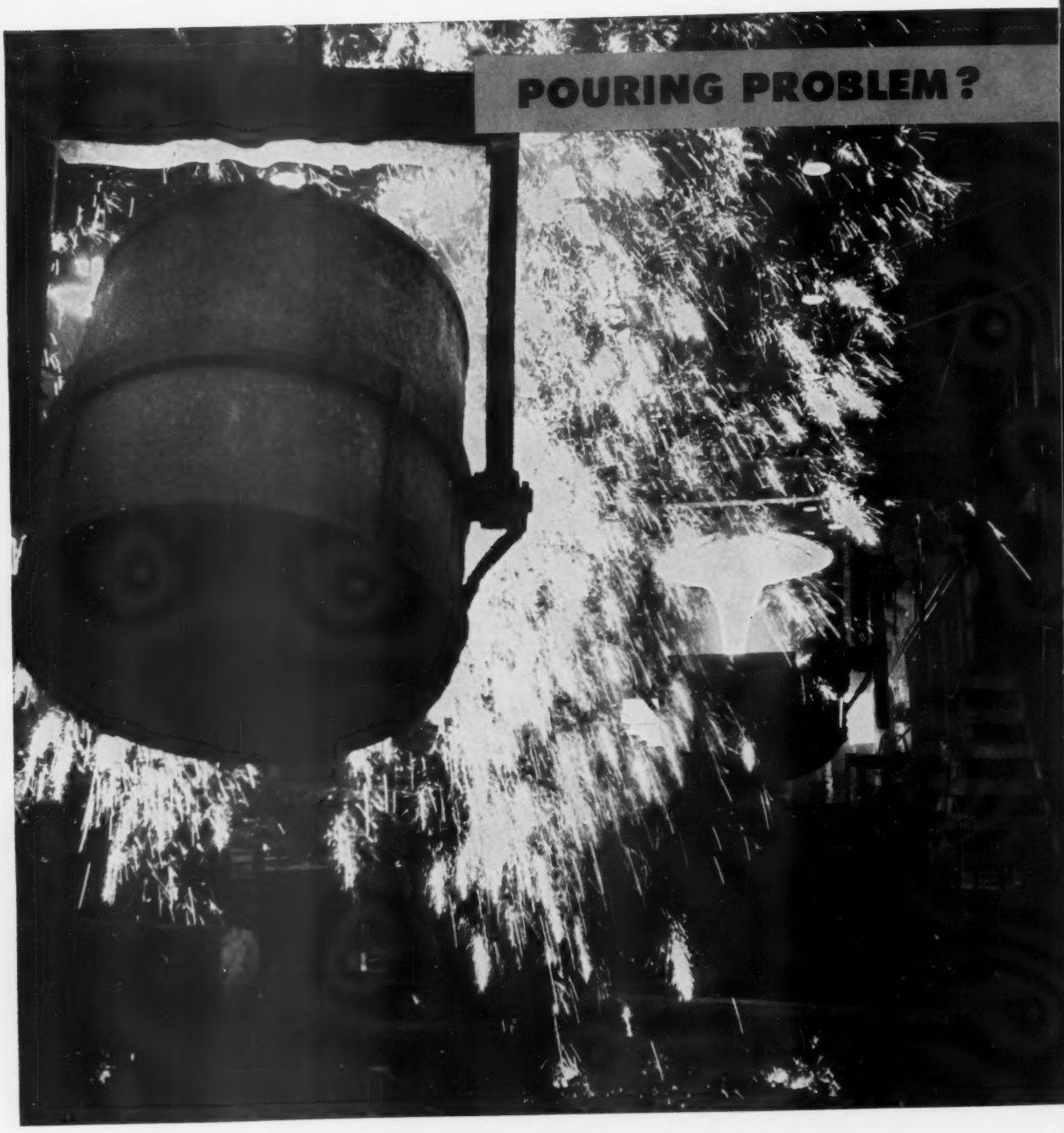
Step up production
Step down costs

The top charge type LECTROMELT furnace increases production through simplicity and ruggedness of design which permits faster charging, quicker heats, and greater capacity.

Users of top charge LECTROMELT furnaces report higher tonnage per man hour, lower power consumption, and savings in electrodes and refractories.

Catalog 9-A describes these furnaces. For a copy write Lectromelt Furnace Company, 314 32nd Street, Pittsburgh 30, Pa. *(a McGraw Electric Company Division).*

Circle 607 on Inquiry Card—Page 209



REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

You can have expert, obligation-free advice from
A REPUBLIC PIG IRON METALLURGIST

He's right up-to-the-minute on all the latest foundry techniques. He knows all types of irons and their characteristics. Knows what they will do or will not do under certain conditions. His thorough knowledge is based upon a combination of years of actual foundry experience and metallurgical training.

The Republic Pig Iron Metallurgist also has the advantage of being backed by the only producer of a complete line of merchant pig irons—Republic Steel. This is an advantage that he can pass along to you by being in a position to recommend the proper grade of pig iron for a specific job without hesitation or prejudice.

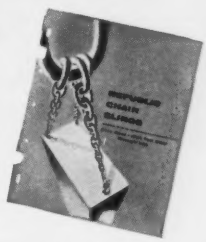
He's a regular and welcome visitor in hundreds of foundries. They rely on him for expert advice on pouring problems, molding practice, improving castings, increasing output, reducing costs.

Have a problem in your foundry? Then ask for the man who knows his irons—call in a Republic Pig Iron Metallurgist. His service is confidential and without obligation. Mail the coupon if you would like him to call at your foundry.

HANDLING PROBLEM? Standard and special units from Republic's complete line of materials handling equipment are solving problems at every stage of production. One company used the PB-120T Box and Skid Units shown above to reduce handling costs 25%, minimize inventory time, provide better visible product identification, free valuable floor space for production equipment. Republic Materials Handling Specialists will help you design units to meet your specific needs. Send coupon for Catalog No. 620.

STORING PROBLEM? Republic Wedge-Lock Steel Shelving solves the problem of storing dies, tools, patterns, etc. This exceptionally strong shelving is designed specifically for high stacking of enormous weights. Joints actually get tighter and stronger as weight increases. There's no sagging, swaying or buckling. Wedge-Lock assembles quickly and easily and is completely flexible to meet changing requirements. It's the answer to maximum loading in minimum floor space. Send coupon for Catalog ES-931.

LIFTING PROBLEM? Republic Chain Slings provide a safe method of lifting heavy and hard-to-manage materials. This new catalog contains complete information and specifications on Republic Chain Slings, Attachments and Accessories. Tells you how to use slings properly to obtain maximum life . . . how to store . . . how to inspect . . . how to order. Send coupon for your copy.



STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
Dept. C-3212
3132 East 45th St., Cleveland 27, Ohio

☐ Have a Pig Iron Metallurgist call.

Send the following Catalogs:

☐ Wedge-Lock Shelving ES-931 ☐ Chain Slings No. 719
☐ Materials Handling Equipment No. 620

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

with the *Exclusive*

fine FANNER FAN-S-CHILLS

provide superior chilling and greater savings

A triumph of modern research and engineering — the FAN-S-CHILL, through its curved "S" design, provides 75% more chilling surface since there is no solid mass.

Exclusive design with its perforated surface and double channel permits maximum parent metal fill-in . . . fuses into cast metal solidly, completely . . . assures better quality castings.

Formed steel fabrication provides highest possible chilling efficiency . . . ideal for general chilling purposes . . . especially in steel.

Lightweight construction provides triple savings — in cost, in shipping and in handling.

Get the facts on the many cost saving features of the fine FANNER FAN-S-CHILL . . . write today for samples and latest prices.

SPECIFICATIONS:

WIDTH: ⅜" — ⅝" — ¾" — 1" — 1¼"

LENGTH: ½" to 5"

Made in heavy, medium and light gauges.

Copper, aluminum or tin coated.

Lighter or heavier FAN-S-CHILLS in special sizes can be made on request.

ENGINEERING SERVICE:

Qualified and specialized engineers in Fanner's Technical Service Division are available for consultation, without obligation, on problems of producing more intricate castings; developing increased strength, closer tolerances, and better quality; reducing machining and improving finish — both in ferrous and non-ferrous castings. Take advantage of the research and development work that Fanner has invested in this field to improve your profit picture! Simply direct your request to the address shown below.

THE FANNER MANUFACTURING CO.

Designers and Manufacturers of FINE FANNER CHAPLETS AND CHILLS

BROOKSIDE PARK CLEVELAND 9, OHIO

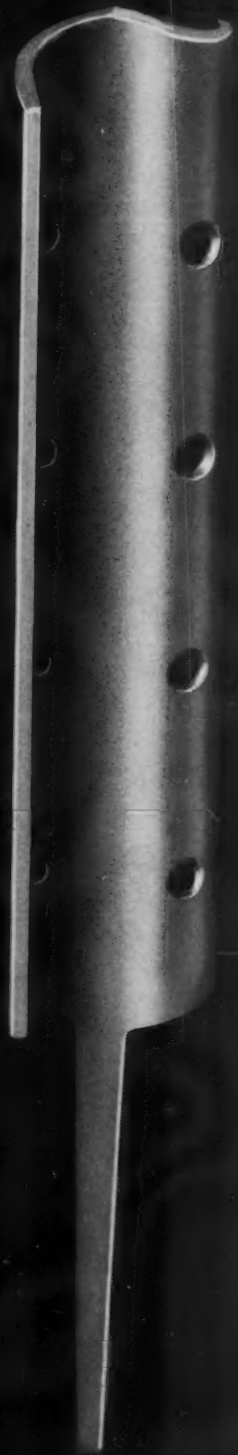
CURVED "S" DESIGN

LIGHTWEIGHT

Savings in cost. Lower shipping charges. Easier to handle on the job.

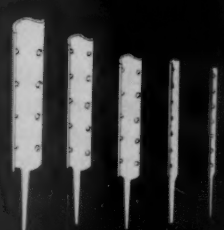
GREATER FUSION

No pockets to trap gases. Perforations permit metal flow-through. So completely fused, difficult to detect even with X-ray.



GREATER CHILLING SURFACE

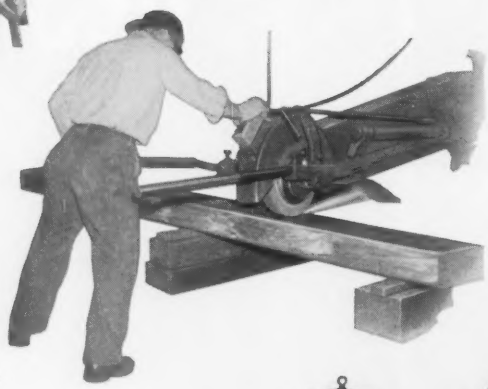
75% greater chilling area since there is no solid mass — produces better castings.



5 STANDARD SIZES

The ideal chill for a wide range of applications. A size for every need — eliminates makeshift chilling.

Progress Means a Better Way of Doing Things...



Mid-West Abrasive
Patented Automatic Billet Grinder

...and Progressive Thinking by Mid-West has made the difference

It's a big step from the old foot-treadle grinding wheel to the hand-operated swing frame grinder. But: it's an even bigger step from the swing frame grinder to Mid-West's Automatic Grinding Machine, which today is reducing costs and increasing production in grinding operations at steel mills throughout the country.

Yet, progress such as this is a normal outgrowth of vigorous research engineering and development at Mid-West Abrasive, where "Progressive Thinking" dictates that normal progress is no longer adequate to meet today's highly competitive conditions. The result: highly skilled engineers and technicians are constantly developing newer products and maintaining top quality in all Mid-West products.

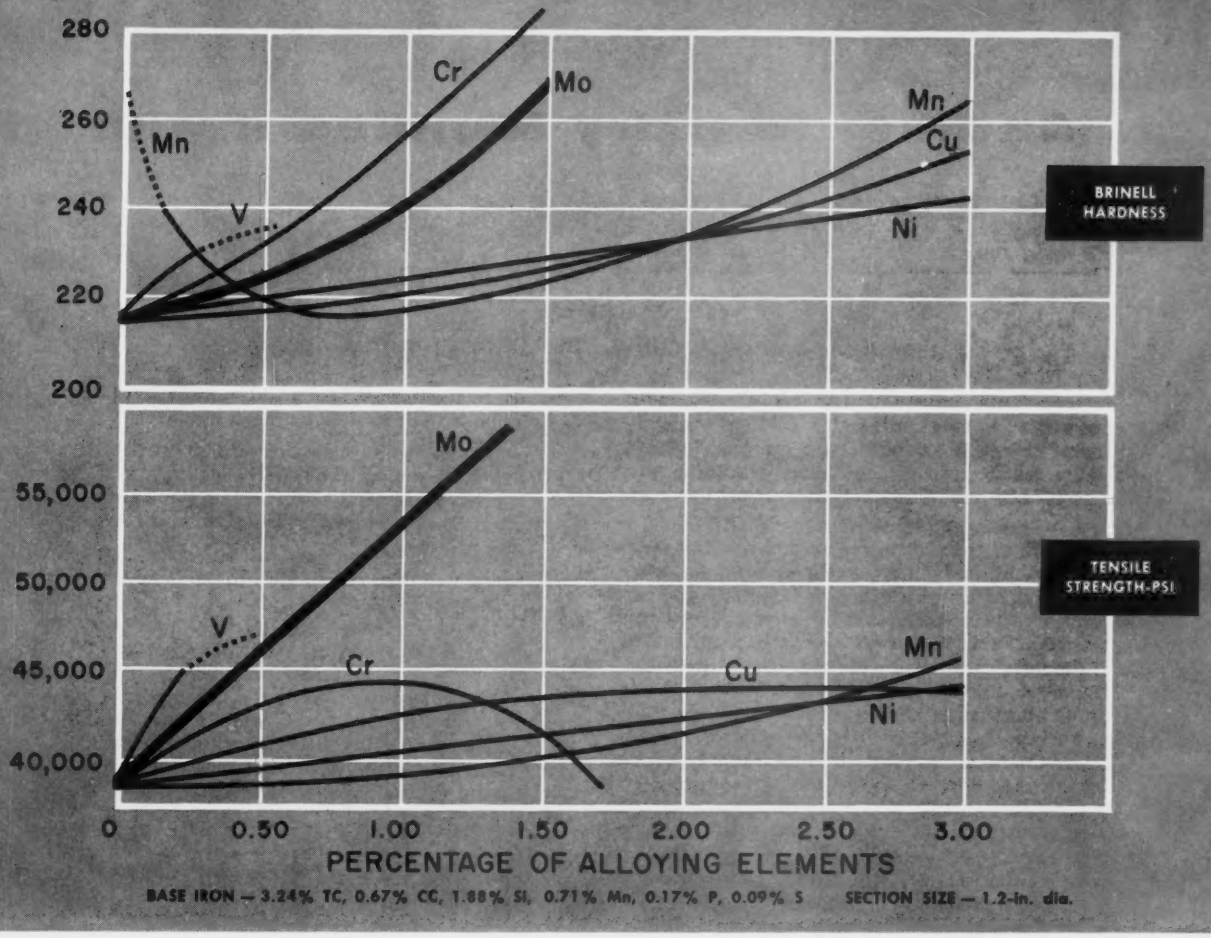
Discover what "Progressive Thinking" can do for you. Write for the name of your Mid-West representative. Get the story on the Mid-West line of grinding wheels, coated abrasives, honing stones, and abrasive grains.

Mid-West wants to be more than just another source . . .
we want to be your working partner on all your abrasive needs.

MID-WEST ABRASIVE CO.

MID-WEST QUALITY ABRASIVES

Executive Offices:
510 S. Washington St.
Owosso, Michigan



Note how additions of moly, up to 1.5%, produce proportional improvements in strength. And, with moly, hardness increases much more slowly. It means higher strengths can be used with less danger of impaired machinability.

each ½% Moly adds 7000 psi to strength of cast iron...

A little moly adds a lot of strength – for molybdenum increases strength more than any other common alloying element, with the exception of small vanadium additions. A rule of thumb is that fifty points of moly raise tensile strength 7000 psi. And without sacrificing toughness. Actually, moly improves toughness at least as much as strength.

What's more, versatile moly aids in obtaining uniform response to heat treatment . . . and in producing machinable, growth-resistant castings. Moly is easy to use, too.

With most grades of cast iron, moly requires no change in the character of the charge, normal melting practice, or the base metal. And foundrymen like the fact that the small additions necessary may be made at the spout or in the ladle.

Write now for "Why Moly Iron". It's the full story of how and why moly adds strength faster than hardness, how it increases fatigue and torsional strength—in short why moly makes better cast iron. Climax Molybdenum Co., Dept. 20, 500 Fifth Avenue, New York 36, N. Y.

CLIMAX MOLYBDENUM

Circle 611 on Inquiry Card—Page 209

Another foundry handles it with

Whiting!

Peak Efficiency Attained In Make-up and Charging!

A large automotive foundry recently expanded operations to meet increasing casting demands. Included in this expansion were various types of equipment to unload and store incoming raw materials, to make up charges, and to charge six new Whiting cupolas.

Here is how the system operates. Coke and stone are brought in by hopper cars which discharge directly into a track hopper. Materials go onto conveyors to skip buckets and the buckets take them up to a belt conveyor that runs the full length of the building in which are the six Whiting cupolas. A motorized belt tripper directs the flow into proper bins. Each cupola has its own coke and stone bin equipped with steam coils to prevent freeze-up. The bins are located directly above batch-weigh hoppers and coke and stone make-up is completely automatic. A selector switch is incorporated so that the system can be manually controlled when weighing up large quantities of coke for the coke bed. Coke breeze is removed by means of a grizzly section in the coke feeder. The system is equipped with sampling gates making it possible for the metallurgist to check the quality of the coke. The breeze is conveyed to a storage bin in the yard and hauled away as refuse.

Pig iron, scrap and alloys are placed in respective bins by the three Whiting 10-ton, 80-ft. span cranes equipped with 65-inch diameter magnets.

Non-metallic alloys are carried on pallets by a monorail carrier. The alloy additions to the charges are carefully weighed on platform scales before being dropped into the charging buckets.

Each cupola is equipped with a stationary skip charger with a full cone-bottom bucket. The buckets receive the metal charge from 100 cu. ft. capacity batch-weigh hoppers which are equipped with a weight recording scale. The charge is made up by the yard crane operator who also operates the scale printweight mechanism from a push button in the crane cab. After the metal charge has been dropped into the charging bucket, the bucket moves to another position where it receives the coke and stone charge and the alloy additions.

This Whiting system is doing a remarkable job . . . it has made possible the needed increased production with a minimum of manpower and with low operating cost.

For the complete story of make-up and charging operations at this automotive foundry including melting operations, write for the spring issue of the WHITING FOUNDER. Bulletin FY-153R gives detailed catalog data . . . ask for it also.

WHITING CORPORATION WHITING 15607 Lathrop Ave. Harvey, Ill.

Weighing additions for the cupolas charge

Coke being measured for the cupola charge

Whiting full cone controlled discharge bucket entering cupola stack.

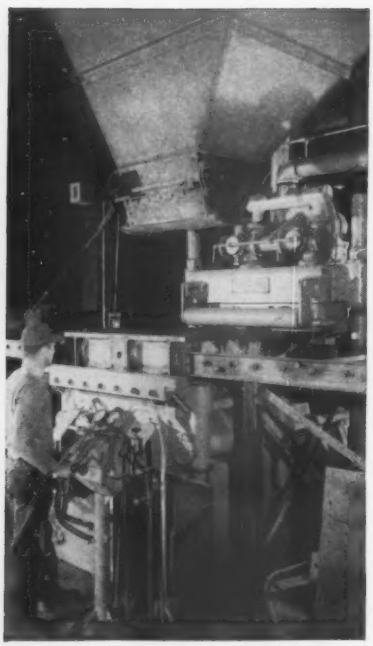
An interesting exterior view of the foundry. At left is the new makeup yard and in the distance are the stacks of the six new Whiting Cupolas. At right is an older foundry building with its six Whiting Cupolas.

A view of the make-up yard showing Whiting Overhead Cranes and various bins.

International MINERALS & CHEMICALS

10 IMPROVEMENTS

1957 TACCONE DIAFORM MOLDING MACHINES



1 OUTBOARD STRIPPING PINS—With outboard pins, you have maximum versatility of flask size, with simple modification to bar-lift or roller-rail lift and a clean working surface at all times.

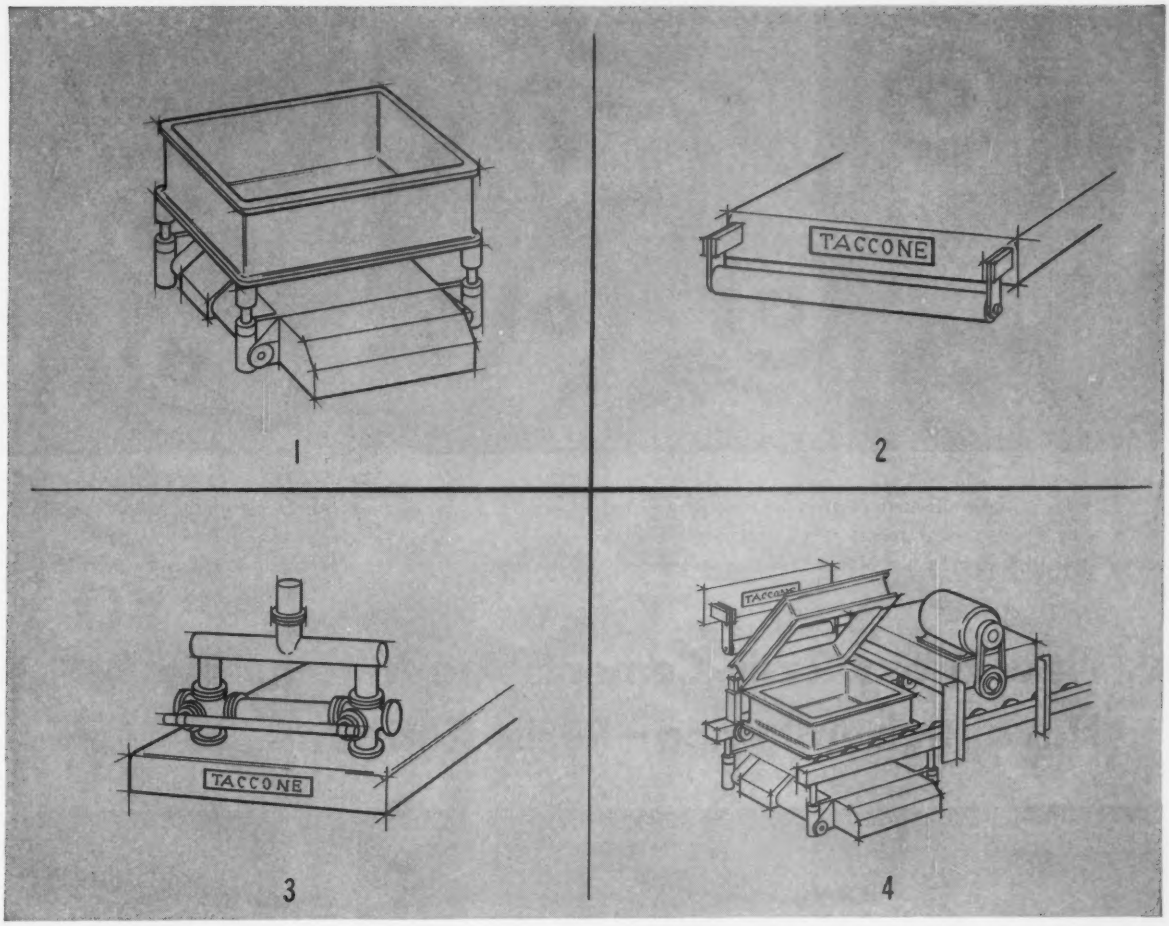
2 PREPACK ROLLER—Spill sand virtually eliminated automatically without danger of ram-offs.

3 DOUBLE INJECTION VALVE AND HIGHER POWER SUCTION—Faster air flow in and out of diaphragm head for maximum speed.

4 UPSET STRIKE-OFF—With this auxiliary equipment you can use shallower, more flexible tight flasks or removable flasks.

5 OUTBOARD OIL CUSHION—Better shock-absorption of traverse car movement cuts molding cycle to the bone.

6 ENCLOSED GEAR BOX IN OIL BATH—Entire strip mechanism working in a sealed bath of oil assures accurate stripping with minimum maintenance.

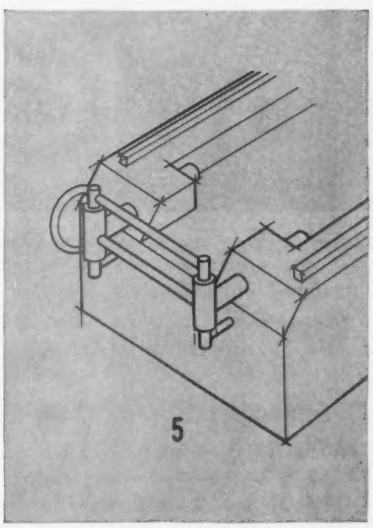


7 DRAWER TYPE MASKING FRAME—You can change flask size quickly for short run and jobbing operations by simple positioning of a metal mask.

8 QUICK-CHANGE TANK—You can now carry a spare diaphragm "loaded and ready" for fast replacement and minimum down time.

9 ELECTRICAL CONTACTS AND AUTOMATION—All models now available with full automation, semi-automation or electrified manual operation permitting a completed molding cycle in as little as seven seconds.

10 FLASK FILLING AND INDEXING EQUIPMENT—For maximum speed, all models are available with built-in automatic flask filling and indexing equipment.



Write for the Taccone Diaform Molding Machine GREEN BOOK

EASTERN CLAY PRODUCTS DEPT. • INTERNATIONAL MINERALS & CHEMICAL CORPORATION • 20 NORTH WACKER DRIVE • CHICAGO 6

Dixie Bond • Black Hills Bentonite • Revivo Bond • Plasti-Bond • Revivo Core Paste • Cupolinor • Cupoline • Taccone Molding Machines

Holes in thin-wall castings are economically repaired with epoxy resin cements. First step is to build a supporting base for the Metalset. In this case foundry sand was forced in the hole and levelled off just below the casting's surface. After the Metalset cures, the repaired area is buffed with a portable power tool.

New Epoxy Resin Cements Are Machinable Have High Adhesion – Resist Corrosion

Nonstructural defects such as these are easily patched and machined with Smooth-On Metalset, an epoxy resin compound available with either iron or aluminum filler. Metalset can be applied in any thickness with less than one-tenth of 1% shrinkage, adheres well to iron, steel, aluminum and can be machined to a feather edge.

FREE Samples of SMOOTH-ON Foundry Cements

METALSET A2–Aluminum-filled epoxy resin
METALSET F1–Iron-filled epoxy resin
SMOOTH-ON No. 4AA–Cement for light gray castings
SMOOTH-ON No. 4A–Iron cement for medium gray castings
SMOOTH-ON No. 4B–Iron cement for dark gray castings
SMOOTH-ON No. 8–Similar to iron cements but with color of aluminum.

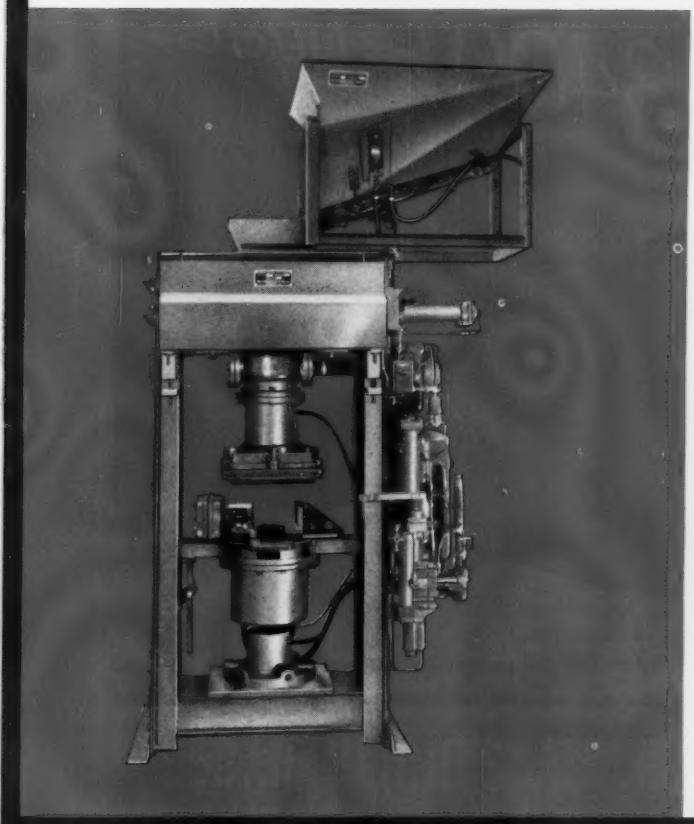
Properties of Smooth-On's foundry cements, in use since 1895, are well known. The new Metalset cements are recommended where adhesion, machinability, or water resistance are stressed.

SMOOTH-ON MANUFACTURING COMPANY, 572 Communipaw Ave., Jersey City 4, N. J. SO 424

A NEW **DEMMLER** AUTOMATION TEAM

FOR HIGH SPEED, CONTINUOUS, FLEXIBLE OPERATION

Now available in unmatched Demmler quality is a new team that permits automated production of cores — continuous, uninterrupted. Fully tested, backed by foundry figures proving highest production records, lowest maintenance costs, greatest flexibility. Write for complete engineering data.



1 SERIES 100 AUTOMATIC CORE BLOWERS

Four sizes, for cores from 2 oz. to 350 lbs.

Blows or Shoots cores, as preferred

Equipped with **both** stationary and slotted sleeve sand magazine feature. Automatic sand agitator optional.

Accurate 10" **draw stroke** permits drawing cores on same machines.

2 AUTOMATIC CO_2 GASSING MACHINE

Equipped with **exclusive** gassing hood; handles full plate of cores at one time.

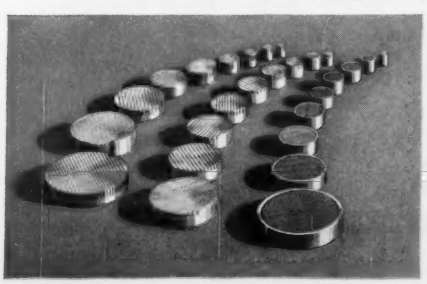
Handles continuous-operation output of high speed Demmler core blower.

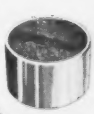
Can be furnished with clamping chucks and injection head if desired.

Gassing time and pressures adjustable to meet any core requirements.

PRECISION CORE BOX VENTS

Many sizes, slot widths and screen meshes are available in brass and steel. Write for descriptive literature.



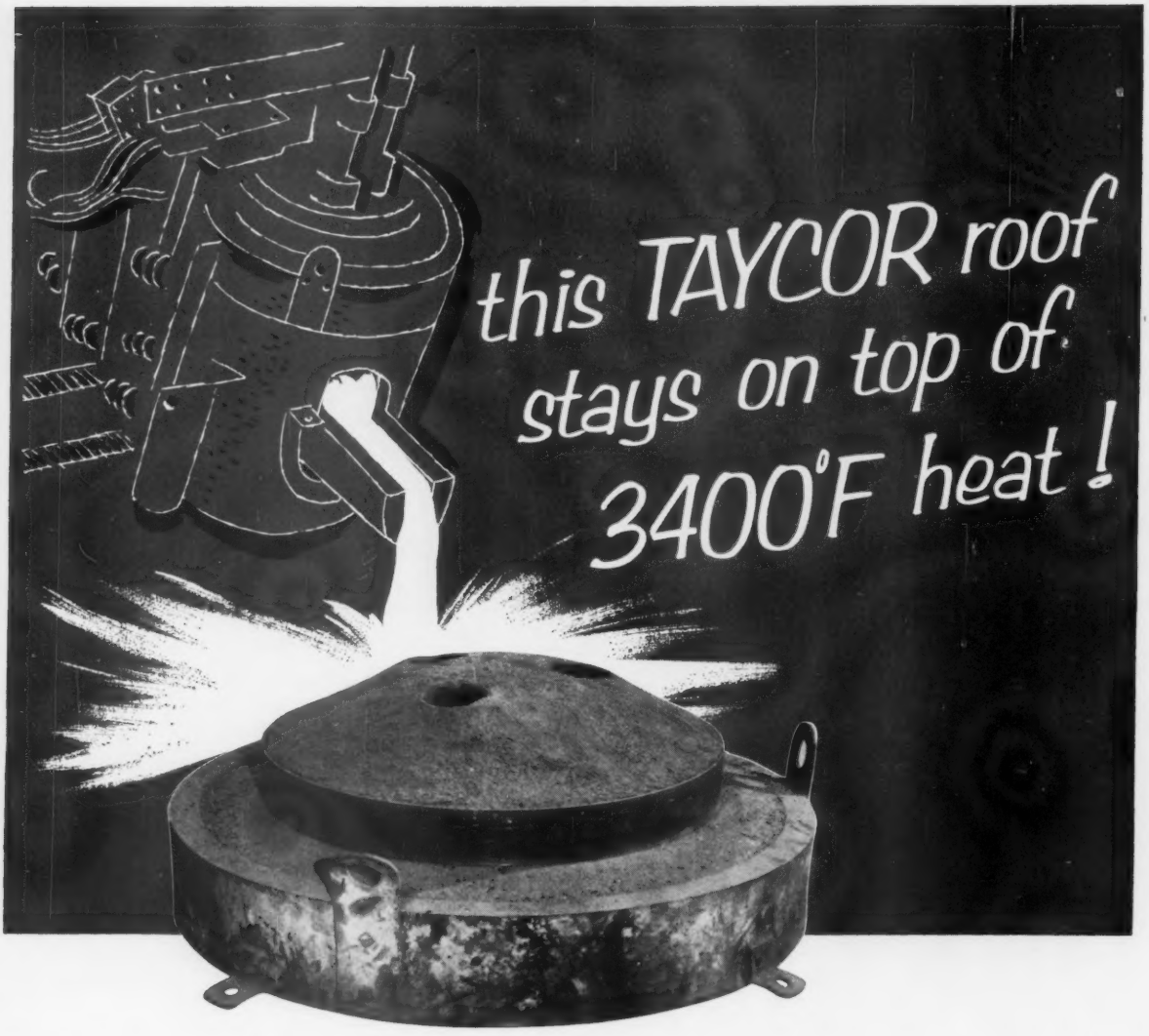


NEW HL 150 MESH VENTS: New general purpose vent which practically eliminates the cleaning courser screens demand. Write for literature.

Wm. Demmler & Bros.

Kewanee, Illinois

Circle 615 on Inquiry Card



This monolithic roof of TAYCOR Ramming Mix is for a 1000-lb. basic direct arc furnace used to melt a variety of heat-resistant alloys. Furnace operates 16 hours daily at temperatures as high as 3400° F. Extensive tests have been conducted to improve roof life for this severe application. The result of these tests proved TAYCOR Ramming Mix lasted *two to three times longer* than any other refractory. TAYCOR roof life varies from a low of 200 heats to a 900-heat record high, depending upon the alloy being melted.

TAYCOR is our trade name for Corundum-base super-refractory brick, special shapes, cements, patches and ramming mixes. The outstanding properties of TAYCOR are exceptional refractoriness, high hot load strength, superior resistance to mechanical abrasion and attack from iron oxide.

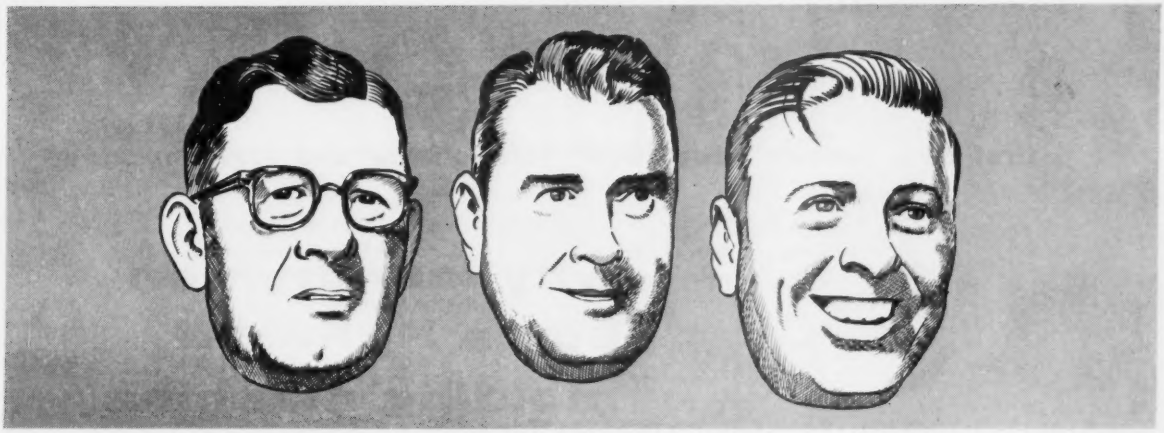
These properties make TAYCOR the ideal refractory for hearths, piers, slot bottoms, front walls, skid rails of forge, heating and heat-treating furnaces . . . for small basic direct arc furnaces operated at higher-than-normal temperatures, requiring long heats . . . for linings of indirect arc furnaces . . . for rammed crucibles of high-frequency induction furnaces. Put TAYCOR to the test in your furnaces. For further information, write direct or call in a Taylor field engineer.

Exclusive Agents in Canada:
REFRACTORIES ENGINEERING AND SUPPLIES, LTD.
Hamilton and Montreal

TAYLOR ZIRCON TAYLOR SILLIMANITE

The CHAS. TAYLOR SONS Co.
A SUBSIDIARY OF NATIONAL LEAD COMPANY
REG. U. S. PAT. OFF.
REFRACTORIES SINCE 1864 • CINCINNATI • OHIO • U. S. A.

Circle 616 on Inquiry Card—Page 209



Meet the Morgan Brothers . . . . . Southern Ohio Clay Boys . . . . .

who let their products speak for themselves!

Yes, and the Morgan brothers, "Red", Howard and Everett, operators of Cedar Heights Clay Co., back those products to the limit. They are:

CEDAR HEIGHTS BONDING CLAY

Has high dry strength, high green strength, high refractory value. Makes a smooth, working sand. Produced in No. 8, 12, 16, 20, 30 and 50 meshes. Can be shipped anywhere, any time. It is the greater durability bonding agent, the economical bonding clay.

CEDAR HEIGHTS FIRE CLAY

Quality control, from mine to bag, gives unchanging qualities of plasticity, high refractory value, smooth, clean texture. The importance of a good, dependable fire clay in foundry operations cannot be under-rated—and Cedar Heights Fire Clay is just such a clay.

CEDAR HEIGHTS AIR FLOATED CLAY

Here's something new in fine quality clay. Carefully selected, artificially dried and ground exceptionally fine (to 200 mesh) it opens up a vast new range of applications. Available every day in the year to foundrymen everywhere. Ask for free samples.

EVERY STEP

QUALITY CONTROLLED

SINCE 1924

CEDAR HEIGHTS CLAY 50 PORTSMOUTH ROAD OAK HILL, OHIO **COMPANY**

first of a series — *the 1500# jolt rollover and draw machine*

why foundrymen buy a HERMAN molding machine

Our experience in building above-average quality molding machines assures you a product designed to do a great deal more than meet your requirements.

They have to meet our requirements which have been established over a period of many years.

There are some good reasons why foundrymen buy Herman Machines. The 1500# Jolt Rollover and Draw Machine illustrated herewith, for example, is shipped completely assembled. Its fast installation costs very little. You can make any repairs above floor level — no pit type foundation. Pneumatic clamps, adjustable horizontally and vertically, quickly clamp any mold or corebox size.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH 22, PA.

There is one rotary type valve on this machine which controls all operations simply and easily.

Rollover and draw is fast and smooth, with no jerking or slamming, thanks to its built-in air-on-oil hydraulic controls. Speed of rollover is easy to adjust. Any irregularities in the flask or bottom board are compensated for by the pattern draw equalizer. Perfect molds come off this machine because of air vibrators and oil controlled draw mechanism.

Any depth mold can be drawn, and the finished mold is deposited directly on the conveyor.

Piston and cylinder wear is reduced to a minimum on Herman Jolt Machines by wear plates. They are easily adjusted to maintain proper alignment without disassembly.

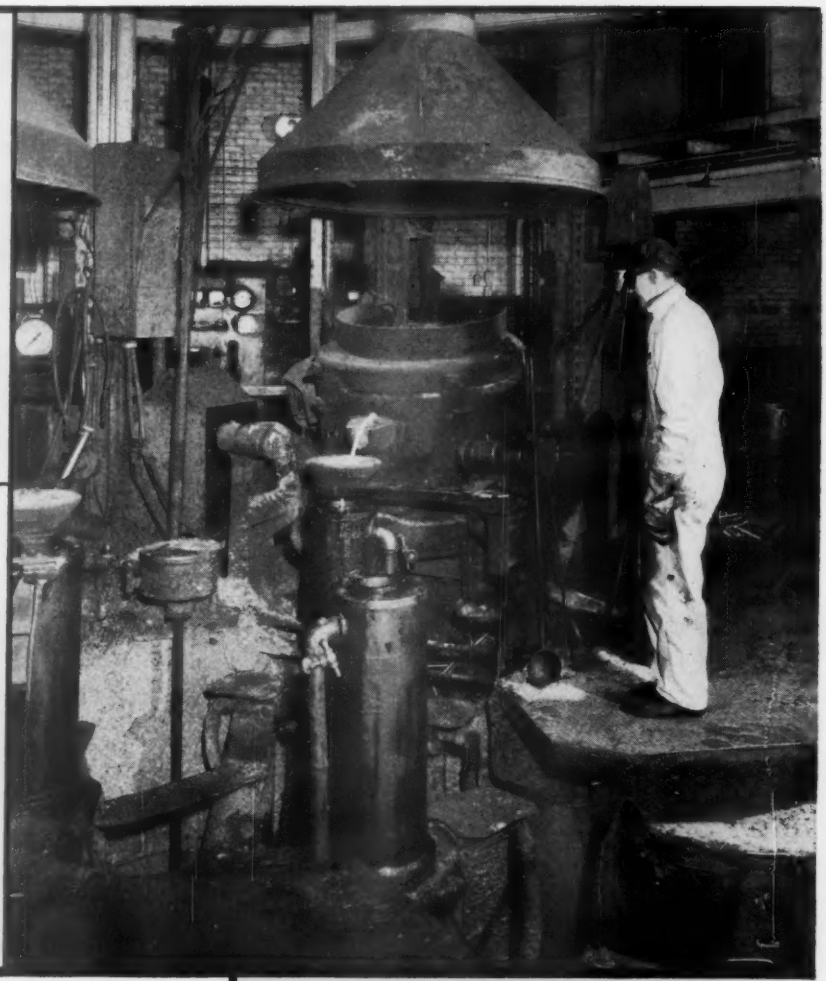
The jolt valve is easily adjusted to obtain desired hardness, and an electric timer is available to govern the period of jolting.

Our representative near you can give you many other reasons why satisfied foundrymen the world over specify and buy this, and other, Herman Machines.

and remember . . . there's a Herman, in all types and sizes, to fit all foundry operations.

Again . . . Norton refractories make good on a tough job

Wolverine Tube Casting Shop selects engineered and prescribed ALUNDUM cement linings for around-the-clock melting service



One of the Ajax-Wyatt Furnaces at Wolverine Tube, Division of Calumet and Hecla, Inc., Detroit, Mich. Furnaces are low frequency induction type, 2,000 lbs. capacity, melting straight copper as the first stage in manufacturing copper condenser refrigeration and other tubular products. Pouring is at 2150°F into the three 300-lb. billet molds on the rotating table in foreground. After a mold is filled and the billet set, the mold drops forward and releases the billet to rollers at bottom right. Operation is around the clock, six days per week, averaging five 900-lb. pours each eight-hour shift. Norton ALUNDUM refractory cement linings on this almost continuous service are giving excellent results.

Norton refractory cements are *engineered and prescribed* for longer, lower cost service across the entire range of furnace applications.

Whatever your own metal-melting problems may be, take advantage of Norton technicians' expert aid. Working with ALUNDUM*, CRYSTOLON*, MAGNORITE and FUSED STABILIZED ZIRCONIA refractory materials they will help you find the exact Rx's you need for more melts per lining and per furnace-hour. For details see your Norton Refractories Engineer. Or write to NORTON COMPANY, Refractories Division, 301 New Bond St., Worcester 6, Mass. *In Canada:* A. P. Green Fire Brick Co., Ltd., Toronto, Ont.

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries.

NORTON

REFRACTORIES

Engineered . . . Rx . . . Prescribed

Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels
Grinding Machines • Refractories
BEHR-MANNING PRODUCTS: Coated Abrasives
Sharpening Stones • Behr-cat Tapes

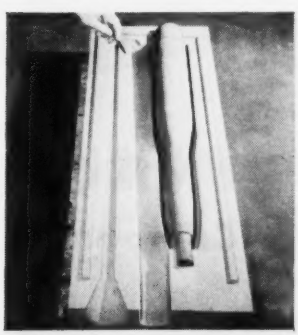
Coremaker cures larger core with portable CO_2 unit, using 50-lb. pressure. Cores are firm, easy to handle.

Cured cores ready to be taken to the metal pouring lines. Specially prepared core sand feeds through chute (left). Sand is hand-tamped into molds. Then CO_2 from jet (center) is shot into molds.

"New sodium silicate-CO_2 process cut our coremaking cost 21% and improved core quality"

—says HANS JACOB, Foundry Supt., Lehigh, Inc., Easton, Pa.

Intricate cores (above) and large cores and molds (below) are economically made and cured in only 2 to 3 minutes. Because no stockpiling of cores is necessary, core room runs as an integral part of the pouring line.



"Since we began using the sodium silicate-CO_2 process, coremaking has been much more efficient and economical," continues Mr. Jacob. "Pasting and mudding costs have been eliminated, and an over-all saving of 21% has been achieved. Hot tears and cracks, and 'lost' tolerances have been decreased, too. And the men in the shop like the new technique because it has no objectionable gases or fumes.

"Production is faster with the sodium silicate-CO_2 process. Most cores are used the same day they are cured," Mr. Jacob concludes.

High-quality Du Pont sodium silicate is available in formulated products for CO_2 systems from foundry supply houses throughout the country.

If you're thinking of adapting the new sodium silicate-CO_2 process to your operation, a Du Pont technical representative will be glad to discuss the process with you.

E. I. DU PONT DE NEMOURS & CO. (INC.)
Grasselli Chemicals Department, Wilmington 98, Delaware

DU PONT REG. U. S. PAT. OFF. **SODIUM SILICATE**

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Says George Edwards, president,
WOODRUFF & EDWARDS, Elgin, Illinois

"Producing top-quality alloys . . . up to 14 heats per day"

with DETROIT ROCKING ELECTRIC FURNACE

In its 15-hour day, the Woodruff & Edwards foundry gets as many as three stainless steel heats, plus ten or eleven other heats, such as ductile iron, Ni-Resist or Ni-Hard.

The 89-year-old foundry entered the alloy metals field two years ago. Says foundry president George Edwards, "We installed a Detroit Electric Furnace as the least expensive way . . . only one-third the initial expenditure required for any of the other alloy production system installations."

Ted Haines, metallurgist in charge of the furnace, operates with two extra shells to eliminate downtime. Shell changeover from ductile iron to stainless steel is accomplished in fifteen minutes or less.

Production of 8,000 pounds of quality alloys per day has repaid nearly half the furnace investment in two years. "This has pleased the front office," says Haines.

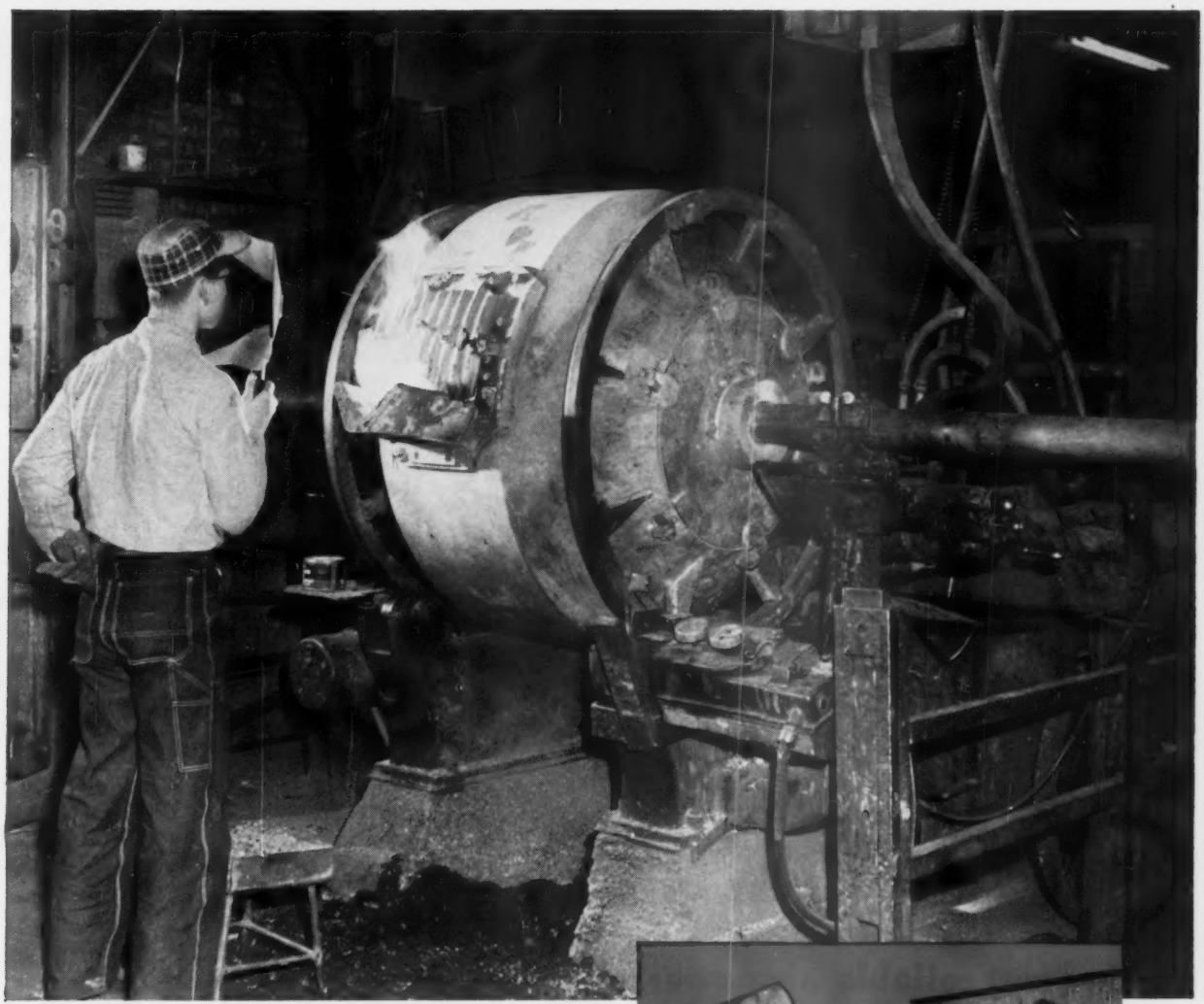
Detroit Rocking Electric Furnaces are doing many foundry jobs well—melting bronze, brass, steel, iron, ductile iron and other alloys. Detroit's indirect arc provides fast, controlled melting. Automatic rocking control assures homogeneity of the melt and greater utilization of heat. Molten metal is washed over a large area of the refractory by the constant rocking action.

Detroit Electric Furnace capacities range from 10 to 10,000 pounds. Send us your operating data—let our engineers show you how a Detroit Electric Furnace will meet your needs.

DETROIT ELECTRIC FURNACE

Kuhlman Electric Company,

Foreign Representatives: in BRAZIL—Equipamentos Industrias, "Eisa" Ltd., Sao Paulo; CHILE, ARGENTINA, PERU and VENEZUELA: M. Castellvi Inc., 150 Broadway, New York 7, N. Y.; MEXICO: Cia Proveedora de Industrias, Atenas 32-13, Apartado 27A3, Mexico 6, D. F., Mexico; EUROPE, ENGLAND: Birlec, Ltd., Birmingham.



Furnace operator "sight checks" heat in Detroit Electric Furnace at Woodruff & Edwards foundry.

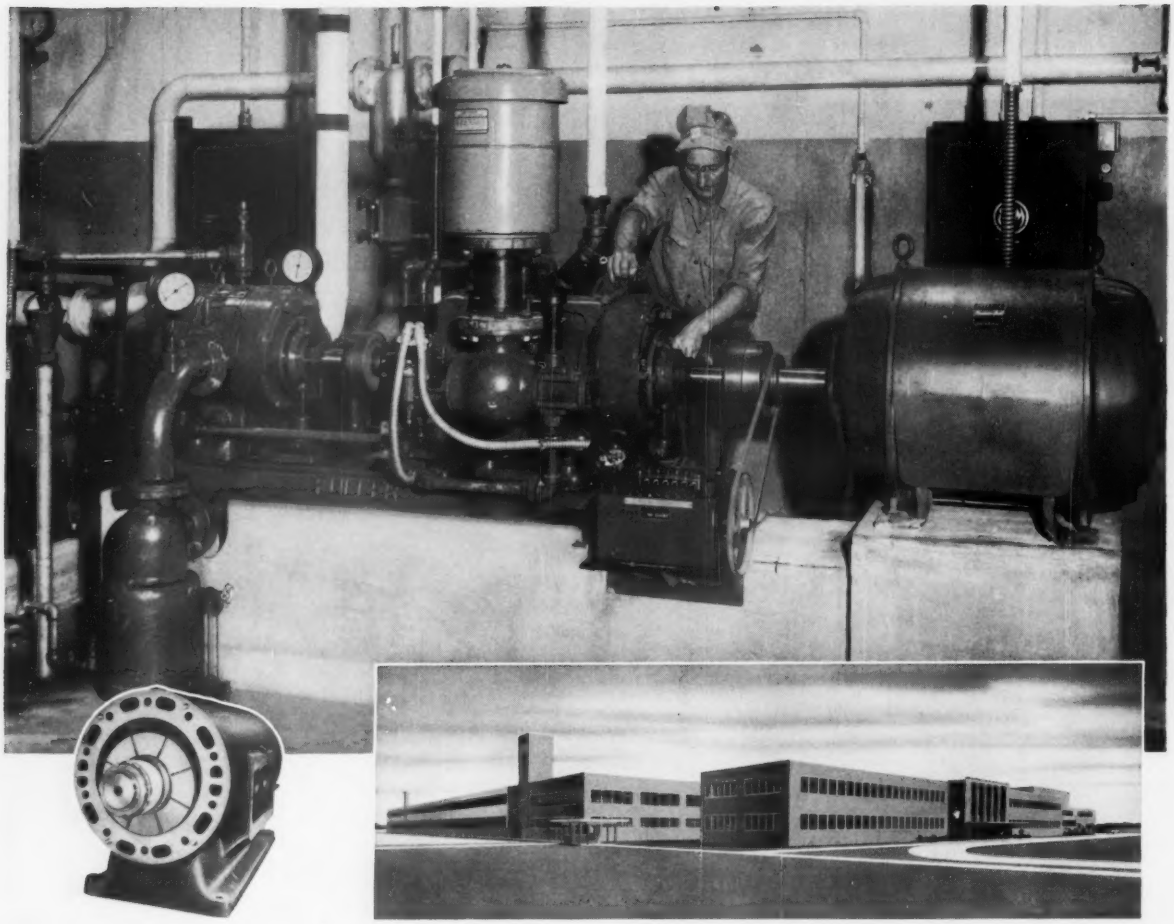
Write for free book!

"High Production with Consistent Quality" provides operational data and ratings on all Detroit Electric Furnaces. Write today—no obligation!

DIVISION
Bay City, Michigan

MEMBER FEMA

Foundry metallurgist Ted Haines checks control board for exact picture of furnace performance. He keeps permanent analysis reports, says, "It's a very fine record."



Modern, reliable air power for a modern, efficient plant

When Electric Controller & Manufacturing Company, Division of Square D Company, Cleveland, Ohio, designed and built its new four and one half million dollar plant, they had their sights set on economical production at high-level efficiency.

One of the items given serious consideration was the supply of compressed air, a considerable quantity of which is used throughout the plant. Fuller Company is justifiably proud to be associated with such a plant in being awarded the contract to furnish a Fuller Rotary Two-stage compressor as the main source of general plant air . . . a modern, efficient compressor for a modern, efficient plant. This machine has a capacity of 281 c.f.m., at 100-lb pressure.

Fuller Rotaries do a very big job no matter how tough the going. It's a job that, more and more, is being multiplied throughout all industry, these machines having gained wide acceptance as an efficient, reliable source of air power.

The key to Fuller's long life, and smoother operation, is *rotary motion*, which provides large capacity in relation to size, simple direct drive from motor or internal-combustion engine, minimum of working parts, air-flow free from pulsations, lack of vibration, continuous service with minimum supervision and maintenance. Installation in cramped quarters or on ordinary flooring is simple and practicable.

For a full description of Fuller Rotary Compressors and Vacuum Pumps, we would like to send you a copy of Bulletin C-5A. Write for your copy today.

FULLER COMPANY
GENERAL AMERICAN
TRADE MARK

FULLER COMPANY

148 Bridge St., Catasauqua, Pa.

SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION

Chicago • San Francisco • Los Angeles • Seattle • Kansas City • Birmingham

C-299
3425

PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

Circle 622 on Inquiry Card—Page 209

Circle 623 on Inquiry Card→

hot process resin coated sand, using the PlastiSand process, now available from 8 points

ACME RESIN

PlastiSand® PROCESS

The establishment of additional coating plants and stocking distributors of PlastiSand makes the many advantages of the PlastiSand Process easily available to all foundries for use in shell molding.

PlastiSand hot process resins are used in the preparation of PlastiSand obtained from these sources. It is impervious to weather conditions or changes. An overhead shelter protecting PlastiSand from direct contact with rain or snow is all that is required.

PlastiSand resins are also available for processing sand in your own foundry, using standard mulling equipment. Virtually any sand may be used with assurance of completely desirable results when combined with PlastiSand cold process resins.

ACME RESIN CORPORATION
1401 CIRCLE AVENUE • FOREST PARK, ILLINOIS

Resin formulation and the coating process covered by Patents 2,706,163 and 2,706,188

Factors that have earned increasing acceptance for the PlastiSand Process.....

ECONOMY . . . Foundries using the PlastiSand Process report superior molds with as little as one-half the resin content formerly necessary with dry resin.

SHORTER DWELL, FASTER CURE . . . Less time on the pattern and a faster baking cycle mean more production, add to the economy of using the PlastiSand Process.

NON-SEGREGATING . . . Each grain of sand is completely and uniformly coated with liquid phenolic resin in the PlastiSand Process—segregation cannot occur.

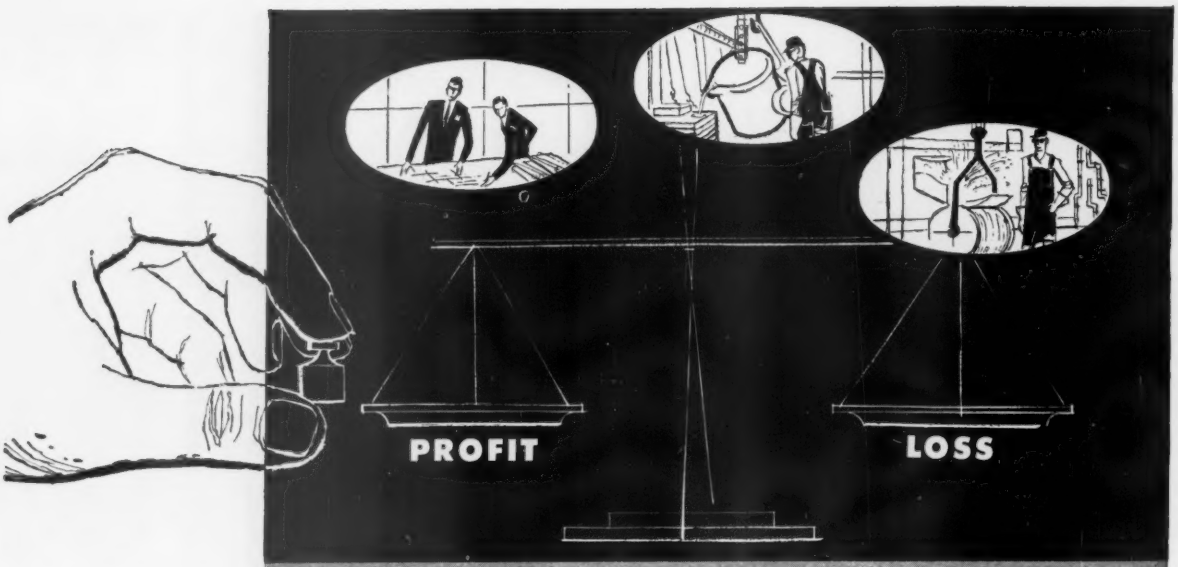
SUPERIOR TENSILE STRENGTH . . . PlastiSand molds have much greater cold strength, a factor gaining importance as new stack pouring techniques are developed.

DUST FREE . . . Because liquid-resin is used there is no dust. An invaluable safety and health factor. The absence of dust means healthier working conditions, no irritating dust fumes, no danger of dust explosive.

NON-CLUMPING . . . Sand, treated with the PlastiSand Process is always free pouring—regardless of temperatures.

GREATER PRODUCT UNIFORMITY . . . Because it is non-segregating, resin-coated sand prepared by the PlastiSand Process yields almost identical molds, batch after batch.

This informative booklet may be obtained by writing to Acme Resin



Knight services include:

- Foundry Engineering
- Management
- Organization
- Industrial Engineering
- Wage Incentives
- Cost Control
- Production Control
- Modernization
- Mechanization
- Materials Handling
- Automation
- Survey of Facilities
- Architectural Engineering
- Construction Management

The sound way to REALIZE ANTICIPATED PROFITS is to AUDIT your operations

In foundry operation, making the best use of facilities and manpower determines the balance between profit and loss.

In many foundries, management and operation audits by experienced Knight engineers have helped to swing the balance to profit—through low-cost, readily effected improvements.

A recent Knight audit for a Michigan foundry resulted in substantial production increases and reduced costs. Improvements included the installation of a conveyor which eliminated handling . . . a rearrangement which increased capacity without additional floor space . . . and automatic timing devices which brought accurate process control and increased production.

These simple low-cost changes, accomplished without interruption to production, are part of a coordinated plan which is designed for future expansion requirements.

If you are interested in an audit of your operations to establish a program of improvement, take advantage of Knight experience and call or write our Chicago or New York office for prompt attention, without obligation.

EVIDENCE OF EXPERIENCE

Lester B. Knight & Associates, Inc.

Management, Industrial and Architectural Engineers

MEMBER OF THE ASSOCIATION OF CONSULTING MANAGEMENT ENGINEERS, INC.

549 W. Randolph St., Chicago 6, Ill.

917 Fifteenth St., N.W., Washington, D.C.

New York Office—Lester B. Knight & Associates, 375 Fifth Ave., New York City 16

Ingersoll-Rand does

BIG THINGS

with Hanna pig iron

Castings made in the Ingersoll-Rand foundries vary in weight from a few ounces to 30 tons. But one thing that never varies is the quality of I-R castings. For over 30 years, Hanna Furnace has been furnishing Ingersoll-Rand with ever-increasing amounts of pig iron that has the high metallurgical qualities and exact analyses required for its engineering grades of iron.

Hanna's wide product range includes the Hanna 38-lb. pig, the foundryman's favorite standard, in all grades, silvery and HannaTite, our special controlled, close-grain iron. Also the HannaTen ingot, a 10-pounder with finer grain structure and no free carbon pockets. The HannaTen also is available in all grades, silvery and HannaTite.

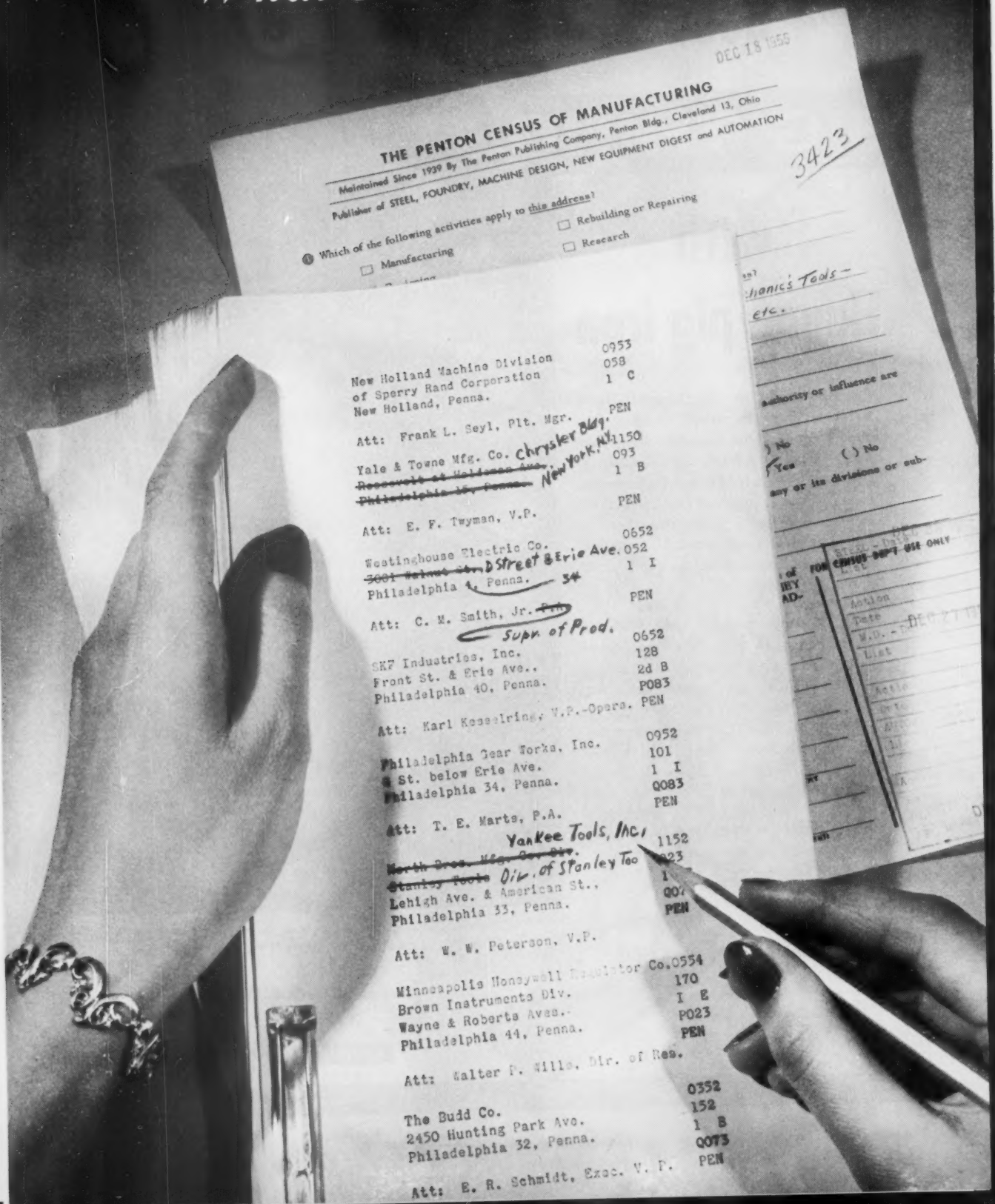
Our customers know that Hanna and its representatives are eager to be of service to them.

Turbine castings, totalling 55 tons, being checked in a test assembly after final machining at the Ingersoll-Rand plant at Phillipsburg, N.J.

HANNA
THE BEST KNOWN NAME IN IRON

THE HANNA FURNACE CORPORATION
Buffalo • Detroit • New York • Philadelphia
Merchant Pig Iron Division of
NATIONAL STEEL CORPORATION

What's the basic benefit you ge



THE PENTON CENSUS OF MANUFACTURING

Maintained Since 1939 By The Penton Publishing Company, Penton Bldg., Cleveland 13, Ohio

Publisher of STEEL, FOUNDRY, MACHINE DESIGN, NEW EQUIPMENT DIGEST and AUTOMATION

DEC 19 1955

3423

Which of the following activities apply to this address?

☐ Manufacturing ☐ Rebuilding or Repairing

☐ Research

etc.

authority or influence are

) No ( ) No

Yes

any or its divisions or sub-

CENSUS DON'T USE ONLY

Action

Date DEC 27

W.D.

List

New Holland Machine Division 0953
of Sperry Rand Corporation 058
New Holland, Penna. 1 C

Att: Frank L. Seyl, Plt. Mgr. PEN

Yale & Towne Mfg. Co. Chrysler Bldg.
~~Roosevelt at Holmesburg Ave.~~ New York, N.Y. 1150
~~Philadelphia 15, Penna.~~ 093
1 B

Att: E. F. Twyman, V.P. PEN

Westinghouse Electric Co. 0652
~~3001 Walnut St.~~ & Street & Erie Ave. 052
Philadelphia 4, Penna. 34 1 I

Att: C. M. Smith, Jr. ~~Pres.~~ Supv. of Prod. PEN

SKF Industries, Inc. 0652
Front St. & Erie Ave.. 128
Philadelphia 40, Penna. 2d B
P083

Att: Karl Kesselring, V.P.-Opers. PEN

Philadelphia Gear Works, Inc. 0952
& St. below Erie Ave. 101
Philadelphia 34, Penna. 1 I
0083
PEN

Att: T. E. Marts, P.A.

~~North Bros. Mfg. Co., Div.~~ Yankee Tools, Inc. 1152
~~Stanley Tools~~ Div. of Stanley Tool 023
Lehigh Ave. & American St., 1
Philadelphia 33, Penna. 007
PEN

Att: W. W. Peterson, V.P.

Minneapolis Honeywell Regulator Co. 0554
Brown Instruments Div. 170
Wayne & Roberts Aves.. I E
Philadelphia 44, Penna. P023
PEN

Att: Walter P. Wills, Dir. of Res.

The Budd Co. 0352
2450 Hunting Park Ave. 152
Philadelphia 32, Penna. 1 B
0073

Att: E. R. Schmidt, Exec. V. P. PEN

from Penton's million dollar census ?

Our million dollar investment in the Penton Continuing Census is paying *you* big dividends.

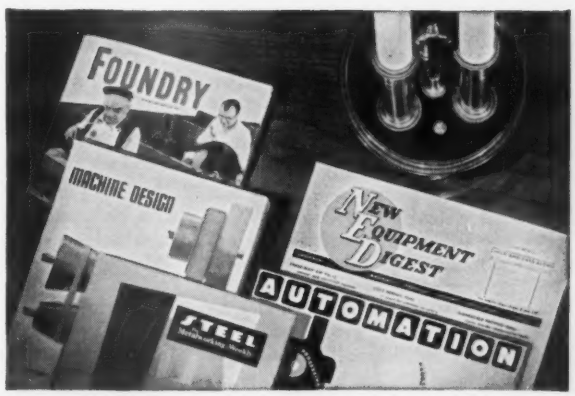
How? This is a *Continuing* Census. For 16 years it has been combing the market daily for new plants. It is continuously catching the changes—checking on personnel turnover, product diversification and plant expansion throughout this changing market.

All of this gathering of information doesn't help you one iota. It's the way we *use* it that counts.

You may assume your basic benefit from this million dollar census operation is the market research information you get—but that's *not* it. Important and helpful as such data is to so many of our advertisers—that's only a by-product of our census.

What is the basic benefit you get from Penton's Continuing Census? It is *constantly effective coverage* of your markets. We're using our up-to-the-minute census findings constantly to be sure we're reaching the right men in the right plants.

That's what you want. That's what you get from each Penton publication to make your advertising more effective.



the PENTON
Publishing Company

PENTON BUILDING • CLEVELAND 13, OHIO

Readers' Comment

Started Green Sand Molding

TO THE EDITORS:

The writer was much interested in the excellent article on "Green Sand Molding of Large Steel Castings" by Charles W. Briggs, and can only take exception to his statement in his opening paragraph that activities along these lines began during the latter part of World War II.

The starting date of producing large steel castings in green sand molds was in 1938 at the General Steel Castings Foundry in Eddystone, Pa., where the writer was foundry superintendent and personally started this method. The opposition by some foundrymen used to dry sand molding was intense. However, the method was successful from the start.

Rudder posts, locomotive driving wheels, both of the spoke and Boxpok types, gear blanks, hammer ram housings and many other types of castings considered heavy were successfully produced, as well as turrets and hulls of tanks later on.

Later on the writer introduced this method to foundries in Canada and in the west.

HERBERT F. MILLER
Consulting Foundry Engineer
589 *Trade Winds Drive*
Dunedin, Fla.

* * *

ALCOA Has Junior Achievers

TO THE EDITORS:

I should like to call your attention to an oversight in your January, 1957 issue of FOUNDRY. On page 178 you have an article titled "Foundry Group Ranks High Among Junior Achievement Companies" in which you state that the Crane Co. sponsored Metallic Knights Foundry Co., the only foundry-sponsored group which supports a foundry-type operation.

We at Alcoa's Cleveland Works have for the past three years sponsored a foundry-type operation. Unlike the Crane company's group, however, we have taken the foundry to the achievers. All of our work is performed on Junior Achievement rented property. The product is an aluminum name plate for desk use or wall mounting. It has been extremely popular and a success each year.

The young people do all of the work, which includes: Bench molding using matchplates into which the lettering has been inserted; pouring from a 20-lb gas furnace; trimming, etching; painting and high lighting the finished product. Two plates are poured in each of six small flasks. Ten to twenty good castings are poured in the 2-hour operating period.

We felt that you would appreciate our bringing this matter to your attention in view of the enthusiasm we and the achievers have for our program.

R. J. WAGNER
Industrial Engineer
Aluminum Co. of America
2210 *Harvard Ave.*
Cleveland 5

* * *

Wants Films on Shell Molding

TO THE EDITORS:

A Foundry Congress will be held at Liege, Belgium early in May within the framework of the Technical Fair. The Technical Association of Foundry, Belgium, has asked us to present a paper on the shell molding process. This paper should be illustrated with technical films showing various aspects of the process from manufacturing shells to pouring and stripping the castings.

We import shell molding equipment and possess short films showing the manner in which these machines operate. However, it is obvious that these films are too commercial for presentation in connection with the paper. Accordingly, we would appreciate borrowing 16-mm technical films, either black or colored, with sound track or subtitles, or slides. We would like to communicate with a few American companies who would lend us such films.

S. A. J. BEECKMANS
75-77 *Rue de Marchiennes*
Jumet-lez-Charleroi
Belgium

* * *

Patternmaker Jurist

TO THE EDITORS:

I had occasion to read your September issue, and was particularly interested in the article about patternmakers who have become distinguished in other fields, written by Dewar Forbes, and especially the part about Judge Campbell.

I knew Judge Campbell personally during his lifetime, and the following is an anecdote which he frequently related with great humor:

When he was Circuit Court judge in Clackamas County, Oregon, while out in the country one day in his horse and buggy, accompanied by an old Irishman named Shannon, the judge remarked to Shannon: "You would be a long time in Ireland before you would be riding with a judge, Shannon." "Faith," said Shannon,

NATIONAL FOUNDRY BENTONITE DISTRIBUTORS

BAROID DIVISION

National Lead Company
Room 1864 McCormick Bldg., 332 So. Michigan Avenue
Chicago, Illinois
(Phone HArrison 7-8656)

Alabama—Foundry Service Co.
Birmingham

California—Independent Foundry Supply Co.
Los Angeles 22

California—Industrial & Foundry Supply Co., Inc. of California
San Francisco 3

Illinois—American Steel & Supply Co.
Chicago 28

Illinois—Fore Foundry Supply & Service Co.
Chicago 10

Illinois—Steelman Sales Company
Chicago 4

Illinois—Western Materials Company
Chicago 3

Illinois—Marthens Company
Moline

Massachusetts—Klein-Farris Co., Inc.
Boston 11

Michigan—Foundries Materials Company
Coldwater

Michigan—Warner R. Thompson Co., Detroit

Minnesota—Smith-Sharpe Co.
Minneapolis

Missouri—Barada & Page, Inc.
Kansas City (Main Office)

Missouri—Mr. Walter A. Zeis
Webster Groves

New Jersey—Asbury Graphite Mills, Inc.
Asbury

New York—Combined Supply & Equipment Co.
Buffalo 7

New York—G. W. Bryant Core Sands, Inc.
McConnellsville

Ohio—Stoller Chemical Co.
Akron 20

Oregon—La Grand Industrial Supply Co.
Portland 1

Pennsylvania—Pennsylvania Foundry Supply & Sand Co.
Philadelphia 24

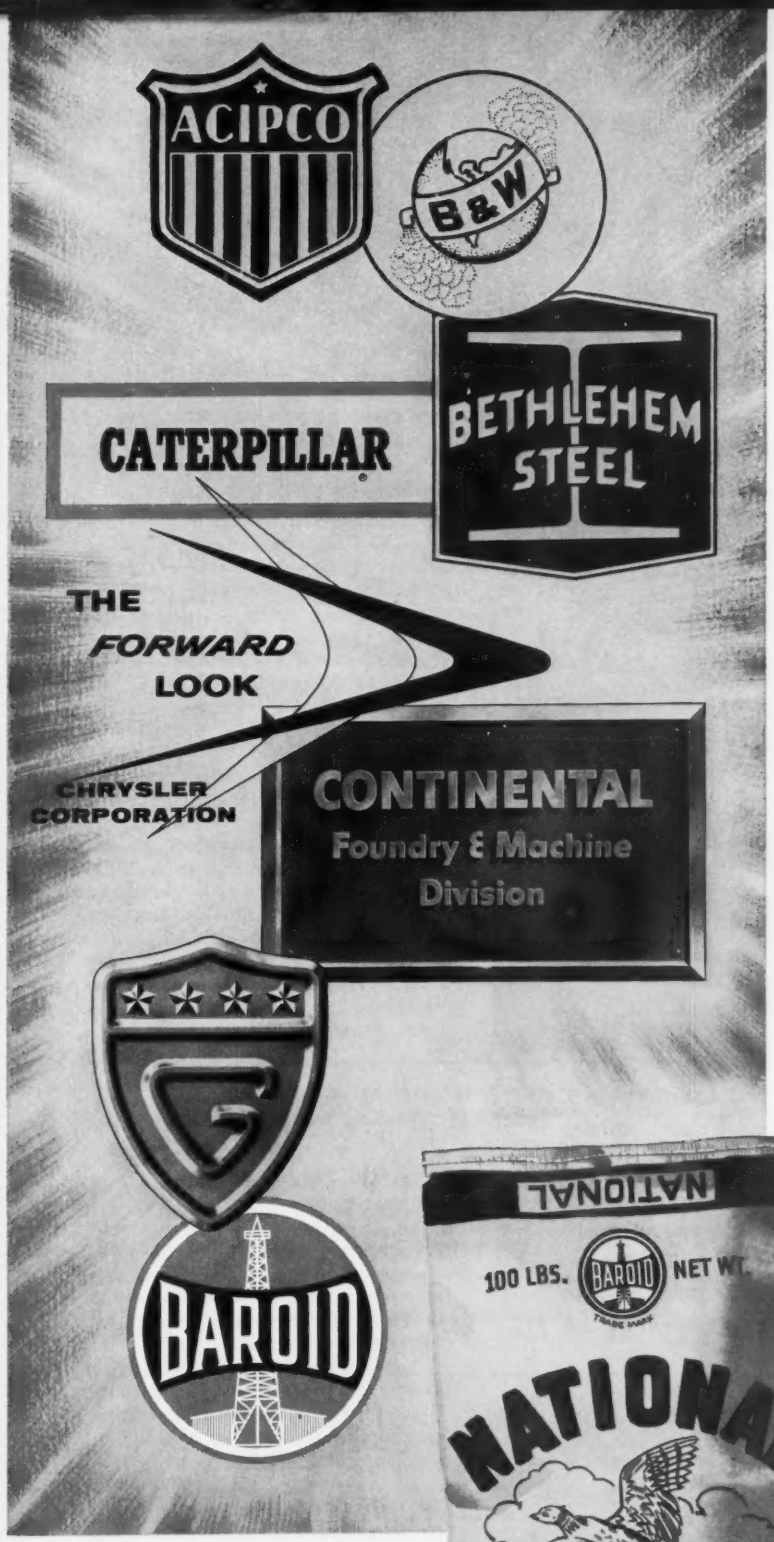
Tennessee—Robbins & Bohr
Chattanooga

Washington—Carl F. Miller & Co., Inc.
Seattle 4

Washington—Pearson & Smith Distributing Div., Spokane Pres-To-Log Co.
Spokane

Wisconsin—Interstate Supply & Equipment Co.
Milwaukee 4

Canada—Canadian Foundry Supplies & Equipment, Ltd.
Montreal, Quebec (Main Office) and Toronto, Ont.



Baroid

NATIONAL BENTONITE .....their source for better bond

Big foundries . . . big users depend on National Bentonite to bond better molds, minimize sand problems and rejects.

They know they can rely on National Bentonite for uniform high quality . . . hot strength to resist erosion, washing and cutting... fewer blows, pin holes or rejects . . . less gas and steam to vent . . . castings that peel clean, shakeout with fine finish.

You can test National Bentonite's superior qualities. Write for sample.

NATIONAL BENTONITE

BAROID DIVISION • NATIONAL LEAD COMPANY

Bentonite Sales Office:

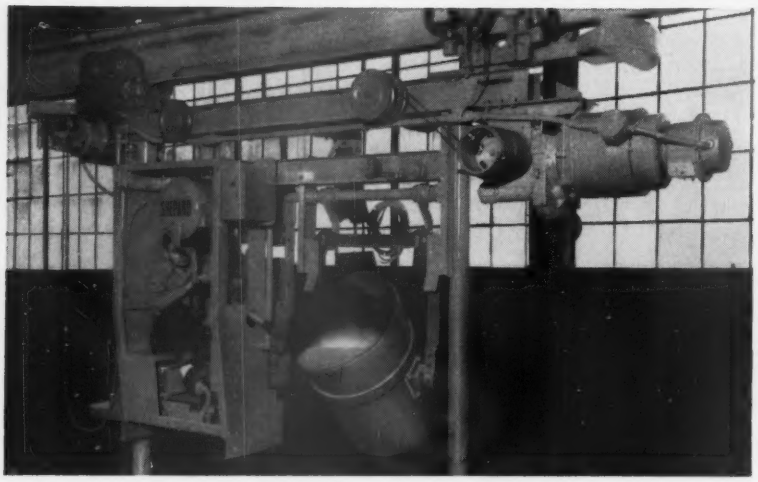
ROOM 1864, McCORMICK BLDG.,
332 SO. MICHIGAN AVE., CHICAGO, ILL.

Circle 627 on Inquiry Card—Page 209

5623

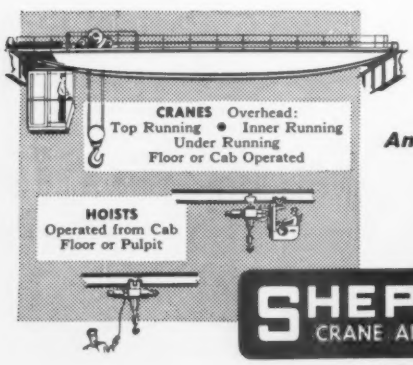
SHEPARD NILES
HOT METAL CARRIER

MOVE HOT METAL
the safe, swift, economical way



MECHANIZE YOUR FOUNDRY for labor-saving, low-cost handling. This modern, efficient carrier moves molten metal swiftly and safely from cupola to pouring line.

Shepard Niles cuts costs, saves manpower by enabling one man to transport and pour metal alone. The carrier operator can see perfectly for precision pouring because his cab is on the same level as the metal he's pouring.



Write for latest Bulletin on Shepard Niles Hot Metal Carriers . . . and, while you're about it, request our representative to call.

America's Most Complete Line of Cranes and Hoists Since 1903

SHEPARD NILES
CRANE AND HOIST CORPORATION
1382 Schuyler Ave., Montour Falls, N.Y.

"and you would be a long time in Ireland before you would be a judge!"

Judge Campbell was born on Prince Edward Island, Canada, spoke the Scottish Gaelic until he was about 12 years of age, and acquired English afterward. He worked as a pattern-maker, and became circuit judge of Clackamas County, and later a distinguished member of the Oregon Supreme Court.

WILLIAM F. PATERSON
Paterson & Paterson
310 *Corbett Bldg.*
Portland 4, *Oreg.*

* * *

Degassing With Chlorine

TO THE EDITORS:

An article in the September, 1956, issue of FOUNDRY discusses the increased tensile properties and elongation resulting from a vacuum degassing process. This does not appear too practical, since one would be restricted to small lots of metal; whereas degassing by the chlorine method allows one to run heats of 1000 pounds or more.

Since 1944, it has been common practice to produce 220 with a T-4 heat treat with a typical tensile strength of 46,000 to 48,000 pounds and elongations running from 16 to 20 per cent. This was accomplished with a simple chlorination of the metal before pouring.

These castings were, for all practical purposes, gas-free, sound, and acceptable for the most rigid aircraft inspection.

ROBERT H. MILLER
Sales Engineer
Gillett & Eaton Inc.
Lake City, Minn.

* * *

Any Old Stoves Around?

TO THE EDITORS:

As an engineer who was around Greenberg's Foundry in San Francisco over forty years ao, I was very much interested in your descriptive article in the November issue on the foundry as it is today.

And I have noted some old stoves among our neighbors in this farming community, but nothing as ancient as the one described in the December issue of FOUNDRY.

T. W. W. FORREST
820 *Carmen Ave.*
Fresno, Calif.

•

TO THE EDITORS:

Your story and photograph of an old stove was very interesting. I wonder if there are any other old stoves around. It might be interesting to ask about that here and there.

M. SMITH
1901 *Centenary Blvd.*
Shreveport, La.

Circle 628 on Inquiry Card—Page 209
Circle 629 on Inquiry Card→

Save by using specialized refractories

Many refractories problems in metal-working furnaces have been solved *economically* by the use of B&W specialized refractory castables. Each ferrous or non-ferrous furnace application requires a specific combination of properties to meet the service conditions. Whether your problem is high temperatures, abrasion and erosion, slag attack or the need for insulation, to name a few, you will find the refractory castable best suited to your requirements in B&W's line. Shown here in digest form are data on the widely used B&W refractory castables for metal-working furnaces:

B&W Refractory Castables for Metal Working Furnaces

	Temp. F	PROPERTIES	TYPICAL APPLICATIONS
B&W Kaocast	3000	High resistance to spalling and slag attack. Low volume change and negligible reheat shrinkage.	Soaking pit covers, linings of high temperature heating and forging furnaces, burner blocks, electrode linings of electric furnace roofs, linings of non-ferrous metal furnaces.
B&W Kaocrete 32	3200	High strength, exceptional refractoriness, unusual volume stability, excellent resistance to spalling.	Can be used in applications similar to those of B&W Kaocast and where higher refractoriness is required.
B&W Kaocrete D	2500	Sufficient strength and hardness to withstand abrasion, considerable physical abuse and erosion.	Aluminum melting furnaces, linings and car tops in heat treating furnaces, as well as in sections of a wide variety of furnaces that are subject to scraping by hand tools or other mechanical abuse.
B&W Kaocrete A	2600	Resists reducing atmospheres. Has good resistance to erosion, abrasion and thermal shock.	Annealing furnace bases and other applications where resistance to reducing atmospheres is essential. Also as a general purpose castable for linings in medium temperature service.
B&W Kaocrete B	2300	Has an adhesive plastic texture particularly suited for vertical or overhanging constructions. Excellent for plastering.	Patching linings and baffles and for any application where plastering rather than gunning or casting is required.
B&W Kaocrete LI	2700	High alumina content, exceptionally high strength for resistance to abrasion and erosion.	Aluminum furnace linings where high alumina content is important.
B&W Kaolite 20	2000	Offers castable's fast, low cost installation plus insulation. Has refractoriness, light weight and low heat conductivity and, in addition, will resist reducing atmospheres. Can be poured or gunned.	Aluminum melting, heating and heat-treating, annealing and forge furnaces. Also for general maintenance and patching.
B&W Kaolite 22	2200	Has the same properties as B&W Kaolite 20. Can be used for higher temperatures but not in reducing atmospheres.	

Send for your copy of B&W Bulletin R-35. It gives additional information on B&W's versatile refractory castables.

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars • B&W Silicon Carbide

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

R561

● Sterling Heavy-Duty Flask rolling on conveyor line in a large midwest cast steel foundry.

STERLING Rolled Steel Channel Flasks Retain Accuracy for YEARS!

★ What type of foundry flask is best for your requirements? Isn't it the flask that's *designed* to retain rigidity and accuracy while under constant production pressure, *year after year?*

Consider, then, these life-prolonging Sterling features: (1) Special hot rolled steel channel construction (2) Tensile strength of 70,000 p.s.i. (3) Solid reinforcing ribs around each section for added rigidity (4) Heavy, steel sand flanges with partings machined to .005" precision.

These are outstanding features with Sterling. Here is unmatched quality . . . the answer to your foundry needs . . . the reason why Sterling Flasks are the choice of more than 13,000 foundries all over the world.

Write for Catalog.

STERLING WHEELBARROW COMPANY

Main office and plant • MILWAUKEE 14, WISCONSIN, U. S. A.

Branches and Dealers in Principal Cities

Subsidiary Company: STERLING FOUNDRY SPECIALTIES LTD.
LONDON • BEDFORD • JARROW-on-TYNE, England

A 7-4503-1PC

Showplace for Castings

The year 1957 will produce at least one first for the foundry industry. The 1st Engineered Castings Show will be staged by the American Foundrymen's Society, May 6-10, in conjunction with its annual technical convention. The show will be held in Cincinnati's Music Hall and will feature exhibits of castings by foundrymen as well as of patterns, metals and alloys, and laboratory equipment for the inspection and control of castings by producers of those materials.

Announcement of this new type of show last year produced considerable discussion throughout the country on the merits of the show itself, its scope, timing, location and other factors. These discussions, both pro and con, have continued. Today, such considerations appear rather academic since the AFS has announced that exhibitor response assures the staging of the show.

More pertinent, perhaps, would be consideration of those factors which would assure success of the undertaking for both participants and exhibition visitors.

Thus far, the society reports, a sizable number of foundries have indicated their intention to exhibit. These companies will provide displays made up of a wide variety of castings produced by practically all methods in gray iron, steel, malleable iron, copper-base alloys, aluminum and magnesium. With continued sales effort on the part of the society, the number of companies exhibiting should increase as the time for the show approaches. Decision on participating rightfully will be made by the individual foundry based on indicated benefits to the company's own marketing program.

With the exhibition shaping up, the society now is faced with the problem of providing a large attendance of designing engineers and other representatives of users or potential users of castings. There seems to be a sizable package to sell. A special technical program for design engineers will include a number of papers dealing with properties of castings, special treatments, testing and applications. Exhibits, representative of this basic industry, will have a wide variety of castings on display and will have available for distribution much desired data on casting properties and applications. A show and a program providing these sources of valuable information can be sold, of course, but it will require a vigorous and continuous promotion effort between now and May.

Greater emphasis on sales has been one of the important developments in the foundry industry in recent years. The 1st Engineered Castings Show offers a new facet to the sales program of exhibiting foundries.

Frank G. Steinebach
Editor

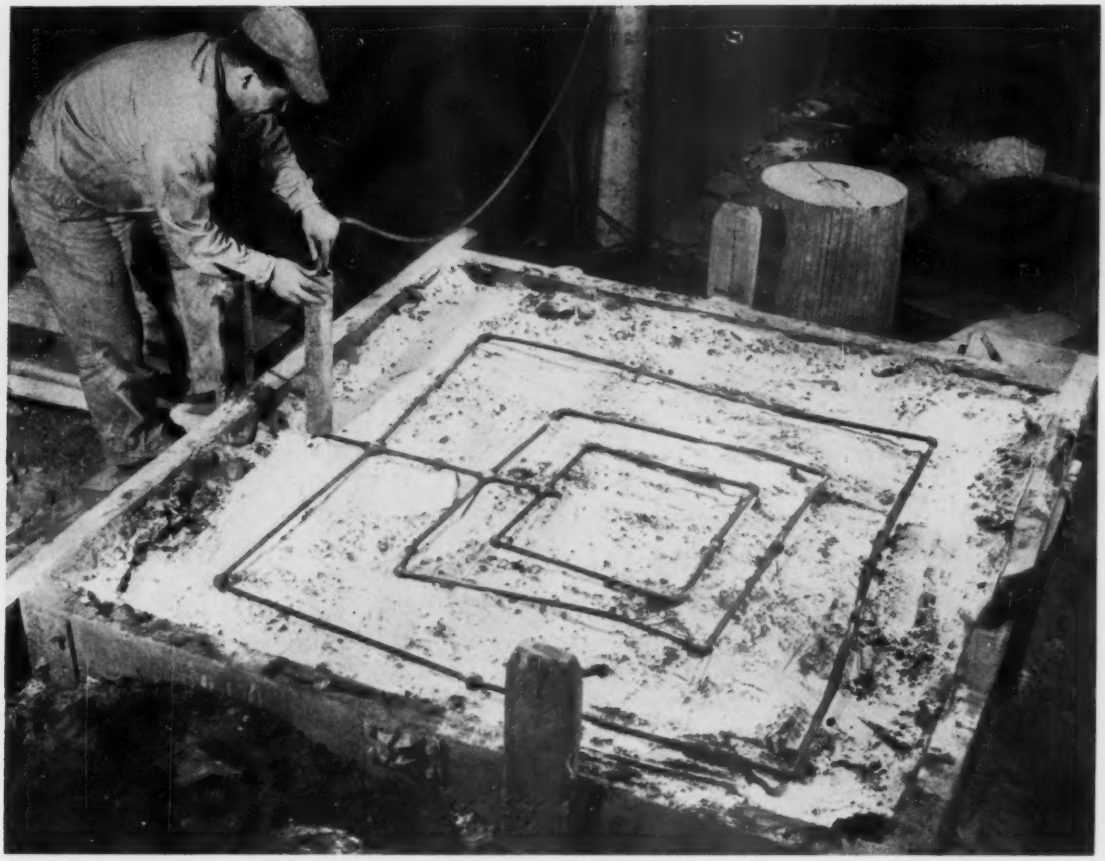
By ROBERT H. HERRMANN
Associate Editor

Making Ship Propellers With

CO_2 Molds and Cores

Use of the CO_2 process for over a year at this foundry has brought many advantages and economies. Methods of producing bronze alloy ship propellers are described

Hoses with needles at the ends carry CO_2 to sodium silicate-bonded sand near the surface of drag molds



Drags are made on a green sand bed over which a slotted pipework grid is laid. The grid permits CO_2 to permeate the sand for complete hardening

FORTY per cent of casting tonnage produced at the Brooklyn, N. Y., Division, of Columbian Bronze Corp., Freeport, N. Y., is poured in sodium silicate-bonded molds hardened with CO_2. Sixty per cent of cores used in all molds are made by the CO_2 process.

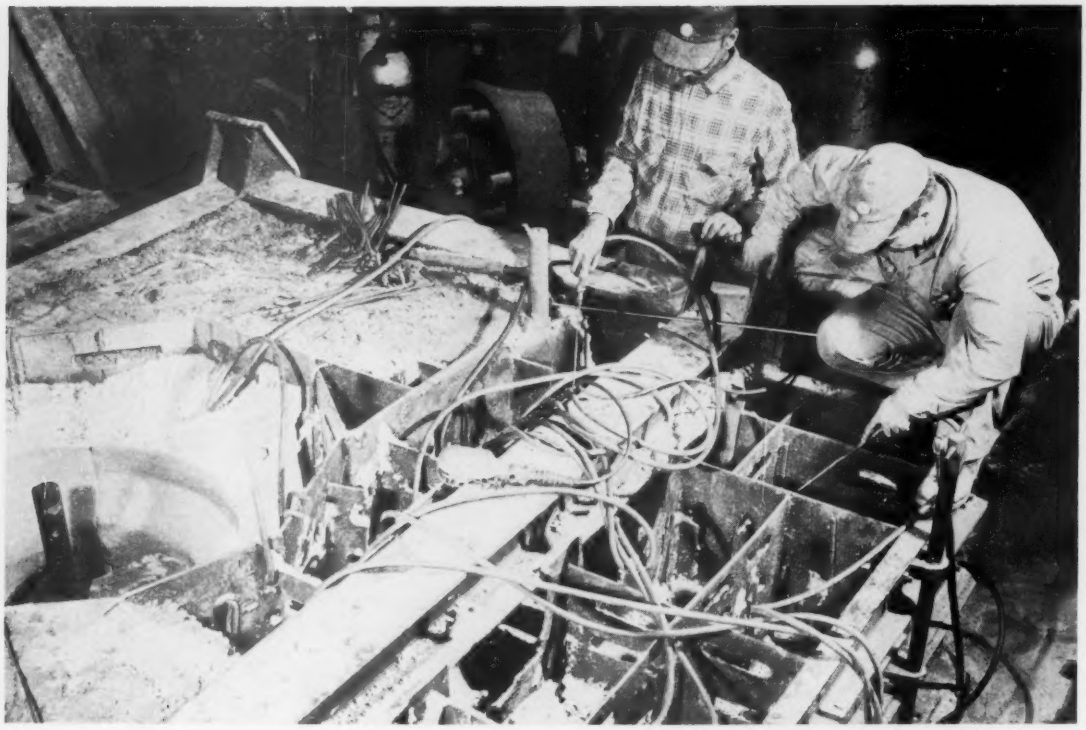
The foundry started using the CO_2 process about a year ago. Within another year nearly all castings will be produced with sodium silicate-bonded cores and molds.

The foundry ships over 100,000 lb of bronze and aluminum castings a month. Of that tonnage 98 per cent is in bronze, mostly in ship propellers. Other castings include bushings 10 in. in diam x 20 in. long with a $\frac{5}{8}$-in. wall thickness; they are used to make piston rings for steam engines and fire control box cover plates for minesweeper use. Propellers weighing up to 13,000 lb have been produced in CO_2-hardened molds.

Principal advantage of the CO_2 process, according to Bernard N. Ames, Columbian president, is the fidelity of castings to pattern dimensions. Excess metal consumed by swells in castings practically has been eliminated. That in itself has saved the company several thousand dollars in a year's time. Additionally, less grinding is required to bring swelled castings down to size.

Save on Molding Time—Molding time also has been reduced. All of the propellers made are multi-bladed, but most of the molds are produced from single blade patterns. The position of these patterns must be changed each time a blade cavity is molded. The number of changes depends, of course, on the number of blades on the propeller. Drags are made first on the floor of the foundry. Some of them are made in green sand and some in sodium silicate-bonded sand. The latter is used

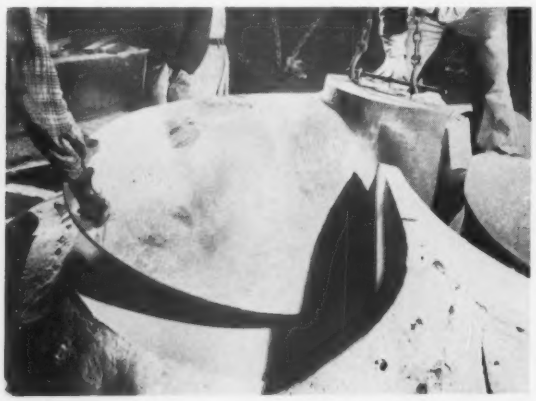
Drag sections are hand-troweled around pattern to facilitate making and drawing cope sections



Copes are made in barred flasks a section at a time with sodium silicate-bonded sand. Gassing is done with needles or through pattern openings

as a facing from 2 to 4 in. thick over a backing of completely dry heap sand. Green sand drags take either a green sand cope or one molded from sodium silicate sand. A nonsilica parting is used on patterns and green sand drags. No parting is required on sodium silicate drags when copes are being made.

The greater time saving occurs in cope production. With the use of single-blade patterns, the cope must be drawn off each time a blade cavity is molded. Green sand practice requires that the mold sections contain many gaggers to prevent drop-outs. Nevertheless, drop-outs were a frequent occurrence. Comparatively few gaggers and rods are required for the sodium silicate sand, and a few of the larger size cope flasks have been made with integral bars and supporting members to eliminate hand gaggering. As each section of the sodium silicate sand cope is molded it is hardened before drawing to change the pattern position. Drop-outs no longer occur.



Single blade pattern is drawn from the drag, and surface of the mold under the pattern is gassed additionally with rubber cup and hose assembly

Mold Gassing—Drags, made with either single-blade or complete patterns, are completely rammed and then gassed from a slotted pipework grid laid in the bottom of the flask. Additional gassing is performed from the mold surface with needles and a rubber cup at the end of a hose attached to a portable CO_2 cylinder.

The cope flask is set on the drag and the cope rammed a section at a time or all at once, depending upon type of pattern used. In either case it is gassed by inserting needles at the ends of feeder hoses into the back of the mold. Provision has been made to gas cope mold surfaces by channeling some patterns and inserting gas outlet pipes. Filler material put over the pipes in the channels is smoothed to conform to pattern contours. The small pipes converge at a common pattern inlet to which the cylinder hose is attached. Gassing pressure for molds and cores is 20 psi. Gassing time depends on mold and core size.

Coremaking—Most coreboxes used at Columbian Bronze are adapted to the making of CO_2 cores. Some, however, require venting similar to that used in boxes for blown cores. Cores usually are

Dry heap sand is used to back up sodium silicate-bonded sand in the cope. Here a worker is shown ramming the back-up sand into place with a pneumatic rammer

Sodium silicate-bonded sand forming the riser over the hub is gassed with needles. The seat for holding riser pattern is shown still in place in the mold

Cylindrical cores of sodium silicate-bonded sand are made with a sweep and wooden guide frame. They form the bore in hubs of large propellers

gassed in the box; then the box is vibrated for the draw. Some cores are given additional gassing to insure proper hardness. The 5 x 9 x 15-in. fire control box core, which weighs about 18 lb, is an example. After the box is drawn, a wooden frame is placed around the core and a piece of plywood set on top of the frame. The CO_2 hose is placed against a hole in the box. Venting is achieved simply through the loose joint between the table and the frame and between it and the loose cover.

A large number of cylindrical cores about 4 in. in diam and 3 ft long are made to form the bore in the hubs of propellers to facilitate subsequent machining of the shaft hole. These cores are made in halves with a sweep and a wooden guide frame. The frame is placed on a perforated metal plate. A coremaker puts sand in the frame, sets the required wires, adds additional sand and sweeps the core. The guide frame is removed and a long wooden box is placed upside down over the green core. Two holes in the top of the box permit gassing.

The gas hose is placed against each hole in turn as the coremaker holds his finger over the open hole after the CO_2 has forced air out of the box. These cores are sprayed with an alcohol-base wash which is ignited after the core has been sprayed. Completed cylindrical cores are made by pasting two halves together and placing cores in an oven for a short time to dry the paste.

Sand Formulation—CO_2-process molding sands for bronze castings are made with 80 AFS fineness washed and dried silica sand plus 4 per cent of a proprietary sodium silicate binder designed for molding mixes. It is mixed in 300-lb batches for 4 minutes in a standard muller. Experience at Columbian Bronze indicates that mixing time is not critical and can vary as much as a minute over or under the cycle. An addition of 1 per cent silica flour is made to mixes to be used for aluminum molding to obtain better surface finish and easier shakeout.

Both sands are kept in containers covered with damp burlap. Open air life of the sands during making of the molds is 2-3 hr, although care is taken not to place sand exposed to the air for some time at the pattern surface. Experience also indicates that the thin crust formed on exposed rammed sand surfaces protects sand underneath from drying out.

Photo courtesy Liquid Carbonic Corp.

Thin ribbon of paste is spread around the parting surface of the drag before the mold is closed. After closing, the mold is weighted for pouring

Core sand formulations contain the same percentage of ingredients as molding sands. The binder used, however, is a proprietary material designed for easier collapsibility than mold binders.

Water, introduced into the mixes by the sodium silicate binder, is held between 0.6 and 0.8 per cent. This percentage has been found to give a workable sand which provides satisfactory molds and cores when hardened. Each batch of sand is tested with a speedy-type moisture teller. Water contents outside the desired range are adjusted simply by adding more binder or more sand to obtain a wetter or drier sand.

Metals Used—Principal metals poured are manganese bronze (59.0 Cu, 39.0 Zn, 1.0 max Al, 0.5 Mn and 0.5 Fe), nickel-aluminum bronze (80.0 Cu, 10.5 Al, 5.0 Ni, 4.0 Fe and 0.5 Mn) and aluminum alloys. Melting equipment in the Brooklyn Division includes a large capacity low-frequency induction furnace for manganese bronze; two rotary oil-fired furnaces for nickel-aluminum bronze; a down draft oil-fired tilting furnace for nickel-aluminum bronze; two similar furnaces for 85-5-5-5, gun metal and other bronzes, and two oil-fired crucible pit furnaces, handling a No. 90 crucible, for aluminum and various bronzes.

Two upright band saws, one horizontal band saw and a swing grinder equipped with a disc are used to cut risers off castings. The removal of fins and other rough grinding operations are performed with portable air grinders and air chisels.

Manganese bronze is being tapped from low-frequency induction furnace into a pouring ladle

By MORRIS GITTLEMAN
Technical Manager
Pacific Cast Iron Pipe & Fitting Co.
South Gate, Calif.

Poor pouring practice wastes good molds and high-quality metal. Here are specific recommendations every foundryman can follow to insure smooth function of the pouring operations in his foundry

How To Pour

CONSIDERING the cost and effort required to produce molds and melt metal, the relatively careless abandon with which these molds often are poured is a constant source of wonder to the student of the foundry industry.

The term "engineered casting," if it is to have any substance, must be endowed with the logical finality of an engineered pouring operation, because a good mold and high-quality metal can be wasted by careless or improper pouring.

Ways in which various deficiencies in pouring practice and control can be overcome are suggested by the following recommendations:

1. In transfer of metal from one ladle to another, the stream should be kept as short as possible.

2. Ladles should be adequately lined, thoroughly dried and kept close to service temperature. The more quickly a ladle is refilled, the less temperature it loses. Good scheduling in filling and refilling ladles is important. The spout should be in good shape and clean in order to convey a uniform stream to the mold. Excess slag should not be allowed to accumulate in the ladle, especially where it can affect the pouring stream.

3. Pouring ladles should not be filled to the brim; this practice makes for sloppy initial pouring and hazardous handling. Normally about three-fourths to seven-eighths full is sufficient. Good practice dictates that the pouring ladle be returned for a refill while still containing a minimum amount of metal. A sound pouring operation reduces the need to transfer metal from one ladle to another to an absolute minimum.

4. Correct height of the ladle spout above the cope mold should be determined. At the author's plant that height is 6 to 11 in. for the fitting molds. The pourer should favor the height that gives him the best opportunity to find the sprue cup hole with the stream of metal. If the ladle is too high, splashing and pancakes may result. Furthermore, to avoid needless crushing or shifting in the mold the ladle should not be allowed to bump the molds along the conveyor either before, during or after pouring.

5. It is very important that the metal stream be directed into the sprue cup and not onto the adjoining cope or weight. It is basic that the pourer should employ this technique at all times.

6. The stream should have a volume which can be absorbed by the gating system. If the volume is greater than the sprue or runner cross-sectional area can take, excess metal floods over the sprue cup, filling the opening in the weight and producing a pancake. On the other hand, if the metal is allowed to dribble into the mold at a rate insufficient to keep the gating system full, numerous defects may result. Misruns, cold shuts, warpage of castings, and the aggravation of sand expansion troubles, etc. are among the possible consequences. It is assumed that the gating system is adequate, and that maintenance of proper ratios between the sprue, runner and ingates makes it possible to keep the gating system full during pouring.

7. Keep the sprue full during pouring and pour continuously. As soon as the metal begins to rise in the sprue, nearing the cup, the pourer must know how to cut off the stream. If not cut off in time, excess metal floods the weight opening and causes a pancake. Also remember that interrupted pouring greatly enhances the likelihood of cold runs and misruns.

8. The metal stream should not only be continuous but should completely fill the mold, without damage to the mold cavity, in the shortest time possible within the provision of the gating system. A range of correct pouring rate should be worked out and adhered to for each operation. Thus at the author's plant, fittings are poured at a rate of 2½-3 lb per second, 4-in. pipe at 10-12 lb per second, and 2-in. pipe at 7-9 lb per second.

9. Rushing the pouring of a mold is poor practice. The pourer either tries to beat the mold around the conveyor bend without stopping the conveyor, or is trying to get out of the next man's way. In any case, he dumps the metal recklessly, causing pancakes and burnt jackets and bottom boards. The pouring operation should be flexible to keep pace with production, avoiding hasty pouring when production is high and requiring crew and ladles to stand by when production is low. This brings us to the organization of the pouring operation itself.

Pouring Crew Is Key—Perhaps the most important item in good pouring practice is the correct and smooth functioning of the pouring crew in

conjunction with the auxiliary facilities associated with the operation. To set up the pouring operation properly, consideration should be given to these factors:

a. The number of molds and their dimensions on the conveyor entering the pouring zone in a given period of time, as well as the average weight of metal per mold.

b. The number of men and ladles needed.

c. Proper selection, design, capacity, insulation and maintenance of the ladles.

d. Speed of the conveyor.

e. Pouring area layout.

f. Over-all length of the conveyor, the number and dimensions of pallets, center to center distance between pallets and the number of molds per pallet.

g. Safety conditions. It should be recognized that poor pouring is often caused by hazardous or oppressive pouring conditions.

In short, a sound pouring operation is one that takes all the elements associated with pouring into consideration, organizes them to pour efficiently and maintains uniformity of practice.

The pouring operation can be regarded as a matter of balance. The molds that enter the pouring bay have to be balanced by the pouring ladles, which must be filled or balanced by the transfer ladles. In turn, the transfer ladles have to be filled at the cupola and brought back to balance the demands of the pouring ladles. This flow goes on simultaneously. The pouring crew foreman or leading man co-ordinates this effort so that pouring keeps pace with production and good foundry practices are observed.

Molding Practice in the

BRASS FOUNDRY

By HARRY ST. JOHN
Foundry Consultant

In his second article on molding practices, No. 19 in his series on *The Brass Foundry*, Mr. St. John discusses centrifugal casting, organic binders, shell molding, investment casting and metal mold casting

IN last month's article it was mentioned that, aside from the common gravity-poured molds of green or dry sand, there are several less common methods of molding and casting. Of these, one of the most interesting is centrifugal casting.

Centrifugal Casting — The centrifugal method may be used with any mold material. The molds are rotated in a vertical or a horizontal position, or even at an angle. In one application, a symmetrical hollow cylinder is cast by pouring molten metal into a cylindrical mold rotating around a horizontal axis. The speed of rotation must be such that the centrifugal force overcomes the effect of gravity, and the metal is evenly distributed on the inner surface of the whirling mold.

The weight of metal poured is just sufficient to make the casting. No core is needed; centrifugal action simply leaves a void at the center of the casting where a cylindrical core would otherwise be required. Slag and any other nonmetallic substances which may be present are so much lighter than the metal that they lodge on the inner surface of the cylindrical casting from which they can be removed by a reaming operation. For the same reason mold gases offer no problem.

This is a standard method for the manufacture of cast iron pipe. It is also used in making bronze cylinders. Rings of any metal may be cut from cylinders cast in this manner, or the rings may be cast individually in molds rotating around a vertical axis.

Some progress has been made in the production of small castings arranged around a central sprue. If we think of the arrangement as a horizontal wheel with the sprue as a hub at the center, we have gates like spokes leading to castings placed around the circumference. Metal poured into the sprue moves with considerable force through the gates into the casting cavities. The problem of feeding during solidification is greatly simplified and there is a tendency to retain light substances such as gases and dross near the center of the wheel, away from the castings. Theoretically one can pour just the right amount of metal so that after solidification there is no sprue at all and very little in the form of gates.

The speed of rotation depends on the size of the mold and the material of which it is made. A small metal mold may be rotated at 1800 rpm and the metal poured with the mold at full speed. For larger molds, horizontal or vertical, 125 to 500 rpm is the usual range of speed. In a green-sand mold, which lacks strength to resist erosion, it may be necessary to start pouring at 5 rpm, then bring rotation up to full speed after a solid shell of metal has formed against the face of the mold. In all centrifugal work, molds must be securely anchored and extreme precautions taken to protect workmen from flying metal.

It is rather surprising that centrifugal casting of the type just described has not made more progress. It has a number of obvious advantages, one of the most important being a casting yield of 80 per cent or more. The principal disadvantage is the time required to pour and handle molds. This can be offset to some extent by the use of stack molding which, however, involves a lower casting yield since the sprue cannot be eliminated.

Organic Binders—Plastic molds, similar to green sand molds, can be made by substituting for water and clay a petroleum product or a solution of thermoplastic synthetic resin. Good strength and permeability are attainable. Flowability is excellent and much better than with conventional green sand. Because of its high flowability, sand of this type is particularly recommended for use in high-pressure diaphragm molding. Organic binders promote sharp contours, close tolerances and a clean separation of casting from sand, resulting in a lower cleaning cost and better finish.

Progress in this field has been retarded by the high cost of the mold materials and by their deterioration with use. A clay-water sand can be

Photo Courtesy Centrifugal Casting Machine Co.

Pouring a casting in a centrifugal mold. Any mold material can be used, and the pouring can be done vertically, horizontally or even at an angle

continued in use indefinitely provided the fines are kept under control, but organic binders leave an oxidized residue where the sand has come in contact with hot metal. Either the sand in use must be replaced completely at intervals or a portion of it discarded after each use so that fresh sand additions will keep the average up to par. The clay-free sand is expensive and the binders cost more than clay and water.

Shell Molding—Shell molding is a novel application of organic binders which has gained a substantial foothold in the foundry industry as a whole. In this method a mixture of sand and thermosetting synthetic resin in loose, dry form is spread over a hot pattern. Heat of the pattern is sufficient to melt the resin for a depth of $\frac{1}{8}$ in. or more, and a shell is thus formed having the shape of the pattern. The shells are later used for casting while the remaining sand-resin mixture which has not solidified is unaffected and can be used again.

Making and handling of shell molds is carried out in machines designed for the purpose. The pattern, passing through the machine, is heated to about 400° F before the flask is filled with the sand-resin mixture. About 10 seconds is required for the preliminary set, after which the excess sand is dumped for reuse and the shell finally cured by heating the pattern to 600° F for about 2 minutes. These times and temperatures are variable within reasonable limits but must be closely correlated to obtain the desired results.

The finished shell adheres closely to the pattern and ejector pins are required for removal. A parting compound should be used. The shells can be stored and the castings poured at a later date. For pouring, the cope and drag shells may be clamped or cemented together, placed in a box and supported by filling the box with steel shot or gravel. In place of shot a clamped framework supporting the shells at critical points may be employed. Very light castings require no backing. Molds may be poured in an upright postion, horizontally, or tilted, depending on the design of the casting and layout of the pattern.

Because of the thinness of the shell—seldom over 3/16 in. thick—the permeability of the mold is very high. The sand needs to be clean, free from clay, and for brass or bronze a four or five-screen sand or 120 to 150 AFS fineness. Formaldehyde resins are commonly used although others also are suitable. A number of satisfactory compounds are on the market.

A recent modification of the shell process takes advantage of the high flowability of the dry sand-resin mix. In this method the sand is blown onto the pattern face to produce a shell of the desired thickness with no surplus to be removed, thus simplifying the mechanics of mold making and handling. The force of the blow also produces a denser mold surface which is a distinct advantage in nonferrous work, where we have to deal with metals of high fluidity at relatively low casting temperatures.

Shell molding has not made as much progress in the brass foundry as it has in the casting of ferrous metals, particularly the stainless steels. The mold material is expensive and the portion which actually enters into the making of the shell cannot be reused. The finish obtained is not likely to be as good as in the best green sand practice. While some dimensions can be held within close

tolerances, those which cross the parting line are a real problem. The shell mold does not give the metal much of a chill and the structure of the casting is likely to be rather coarse unless the pouring temperature is low. For this reason any brass or bronze casting which has both light and heavy sections is not easily made in a shell mold.

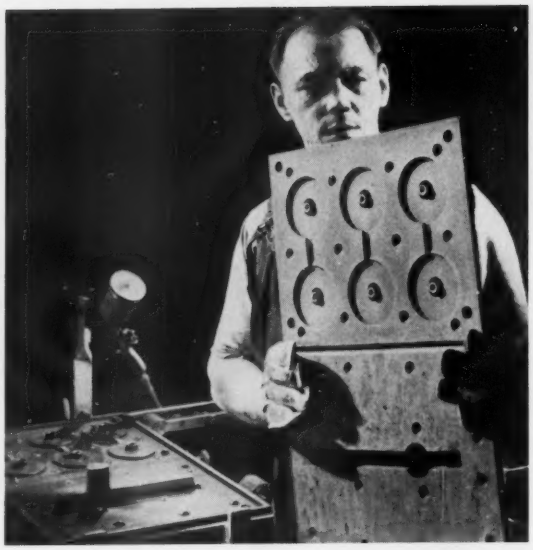
A more widespread adoption of shell molding in brass foundries depends on getting a better surface finish and on decreasing the cost of mold materials. It may actually be worth while to use a more expensive sand if this can be reclaimed for reuse. Perhaps cheaper binders can be found. Almost certainly the quantity of binder used can be decreased by more efficient methods of making the mold. Blowing the mold is a step in this direction. For brass and bronze, hard packing of mold material against the face of the pattern is an essential regardless of whether the mold material is a green sand tempered with water or a sand-resin mixture. At present it would seem that the skin-forming characteristic of the aluminum and silicon bronzes make these alloys more suitable for shell molding than are the brasses and tin bronzes.

Cores made by the shell process have desirable properties and are much less handicapped by the disadvantages peculiar to shell molds. A later article on core practice will treat this in some detail.

Cement-Bonded Molds—Sand molds bonded with portland cement have great strength and yield castings with good finish and accuracy of detail. The cement must be given time to set before the pattern is removed and, as a rule, castings cannot be poured until two or three days after the mold is made. Molds of this type find their principal use in making large ferrous castings. They are of little interest to the nonferrous foundryman.

Plaster Molds—Molds made of plaster of paris, on the other hand, are essentially nonferrous in their application. Plaster of paris is mixed in various proportions with such materials as talc and asbestos to obtain desired physical properties in the finished mold. The mixture is added to water in the proportion of about 160 lb of water to 100 lb of the dry mix. The resulting slurry is poured over the pattern and allowed to set for about 30 minutes. Metal patterns must be used and a parting compound is necessary. The molds are then dried for some hours at a temperature of 400° F or more. Although trouble originally experienced with moisture pickup from the atmosphere has largely been overcome, the molds should be poured as soon as possible after they are made, preferably while still warm. High permeability can be obtained by foaming with air during the mixing cycle.

A modified form of plaster molding, known as the Antioch process, utilizes clay-free sand as the base ingredient with plaster of paris as the binder. Asbestos, talc and sodium silicate are other ingredients of the mixture, amounting to about 10 per cent of the total. Sand and plaster of paris



Shell molding has not made as much progress in brass foundry as in casting of ferrous metals

are in almost equal proportions. Much less water is used than in ordinary plaster molding, and patterns can be removed after a setting period of 5 to 10 minutes. After a further drying period of 5 to 10 hours the molds are subjected to steam pressure, then air dried and finally oven dried at 450° F.

Plaster molds produce castings of fine finish and exceptional accuracy of detail. The process is most suitable for small intricate castings which would otherwise require much costly machining.

Carbon Dioxide Process—A more recent method of producing molds having cement-like characteristics is the carbon-dioxide process. Basically this consists of treating a mixture of sand and sodium silicate with carbon dioxide.

A chemical reaction between the silicate and the gas produces silica gel and sodium carbonate. The gel acts as an exceptionally firm binder. A clean, clay-free silica sand is required. This is mixed with about 5 per cent of water glass (sodium silicate) and mulled. The mold is made in usual green sand fashion but is not removed from the pattern until after gassing. One method of introducing the gas is to punch holes at several points in the mold and apply the gas at these points. Another way is to flow the gas into a hollow pattern which is perforated so that the gas can escape into the sand immediately in contact with the pattern. Only a facing of the special sand is necessary; the backing can consist of used sand. Since stripping is difficult where deep draws are involved, it is sometimes better to make the ungassed sand mix unusually strong so that the pattern can be withdrawn before gassing.

The carbon dioxide process is more generally applied in the making of cores than in the making of molds, a subject which will be discussed in a future article. The fact that such cores do not have to be baked and that driers are unnecessary

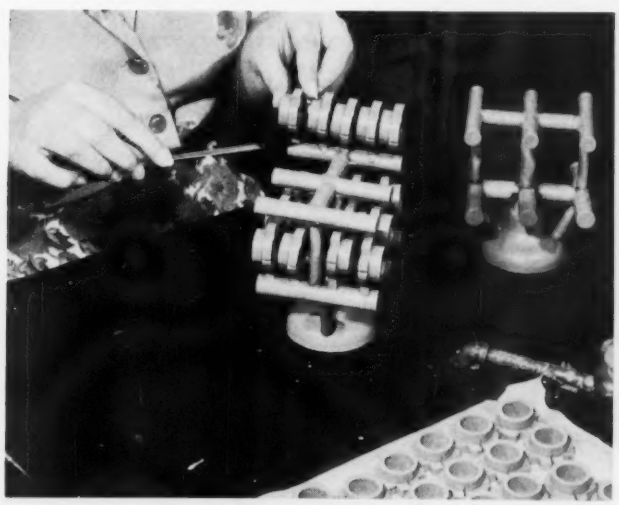
make this use of the method particularly interesting. It is worth noting, however, that cores made in this manner can be used as inserts in large green sand molds, to insure against erosion or breakage of the mold in deep pockets and places where the sand mold has a thin section.

Investment Casting—Investment casting, once more generally known as the lost-wax process, is an old casting method recently come into prominence for certain specialized applications. A metal master pattern is used to form out of wax or a synthetic resin what may be called a negative pattern—that is, a shape having exactly the form desired in the finished casting. The gating system, of the same material as the wax pattern, is put together separately and attached to the pattern at any desired points. The assembled pattern is then coated, by dipping or spraying, with a thin layer of refractory cement.

After drying for several hours, the coated pattern is placed in a flask and the mold completed by filling the flask with a refractory investment mixture. This again must dry for several hours. The hardened mold is heated to a temperature sufficient to melt the wax and placed in such a position that the wax will drain completely, leaving cavities of exactly the shape of the wax pattern and gates. If a resin is used instead of wax a higher temperature is required.

The refractory materials used must be selected carefully as to composition and grain size to fit the desired application. For high-temperature work, silica, which crystallizes in several forms having different thermal expansion characteristics, is the base material. An organic silicate is the usual bond. Since molds are sometimes preheated to as much as 1800° F there is great danger of cracking if everything isn't just right. At lower temperatures plaster of paris can be used.

An interesting modification of the investment process utilizes frozen mercury in place of wax. Parts formed of mercury cooled to 90° F below zero can be manipulated briefly at ordinary temperatures. The finished mold is freed of mercury at room temperature but must be heated to 1850° F to get rid of the organic binder used in the investment.



Investment casting usually employs wax or resin patterns and gating system joined as shown here

It is obvious that investment casting is too elaborate and costly a process for use in making the ordinary run of brass castings. It is applicable only where prohibitive machining costs can be avoided in forming thin and intricate metal sections. Investment casting is extensively employed in dental work and has found recent application for intricate parts of heat-resistant alloys used in jet and turbojet engines. The fact that an investment mold has no parting line and that gates can be attached to any desired part of the casting make possible some castings which cannot be made in any other way.

Metal Mold Casting—Theoretically, exceptionally good surface finish and high physical properties can be obtained by casting in a metal mold; in the case of the light alloys this is true. With the brasses and bronzes the chilling effect of the mold promotes a fine-grained structure and great strength, but only in a newly finished mold will the castings have a good surface appearance. Early in the life of the mold its surface will develop fine cracks or "heat checks," each of which results in a fin on the surface of the casting. Molds made to accurate dimensions are costly and their life short—about 5000 castings for a red brass or tin bronze. Gravity casting in metal molds is not commonly practiced in brass foundries.

Metal molds are also used in pressure die-casting where metal, molten or semimolten, is forced into a steel die under high pressure. This process is in limited use for brass but does not seem to be expanding. The steel dies are highly expensive and their life short.

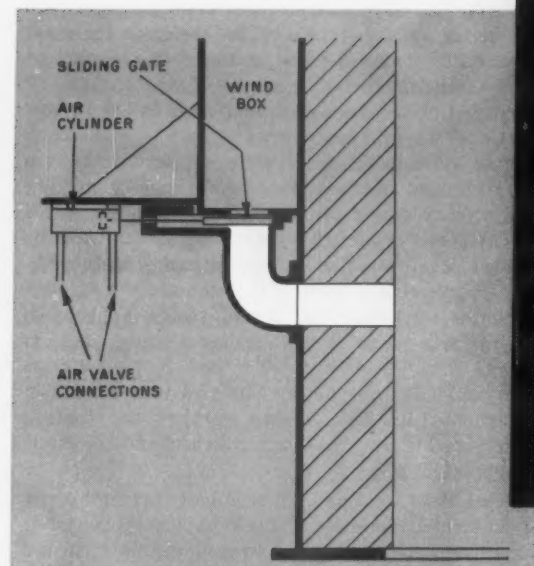
The die casting process currently is successfully employed with zinc and aluminum alloys, both for the large production of small castings and for making large castings of thin section, such as automobile grills and door frames. In all cases the working temperature of the die is important and must be controlled closely.

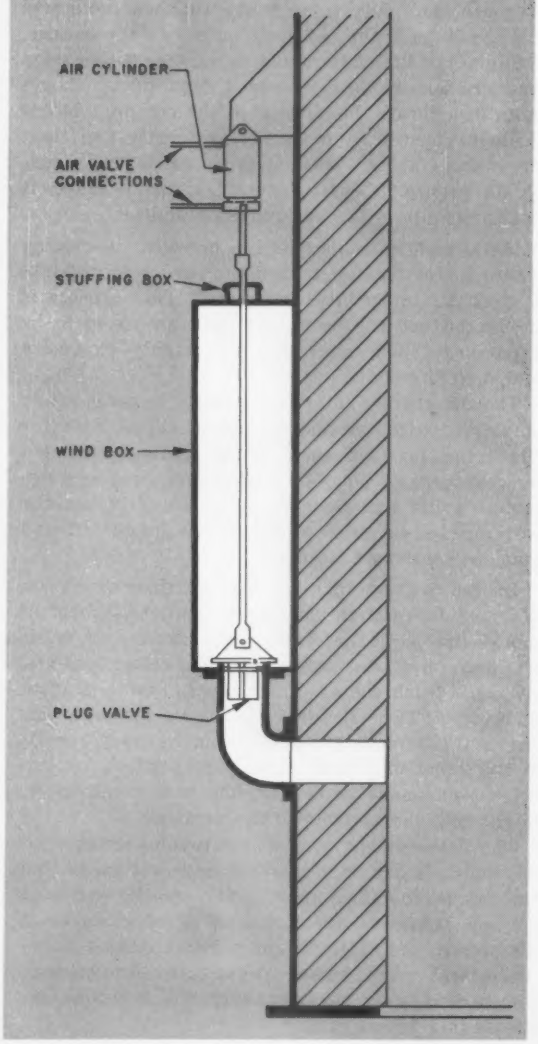
In the writer's opinion, the further expansion of brass die casting depends on the development of more suitable die materials. Thus far the emphasis has been on steel alloys designed to resist heat and erosion. Such metals have a very low heat conductivity. The abrupt temperature gradient between the surface of the die and its body results in the "heat checking" already mentioned. A less refractory metal with a higher heat conductivity might give better over-all performance.

The development of new and revolutionary casting methods has been so rapid in recent years that the brass foundryman is wise to proceed with caution before committing himself to changes in his present practice. There is danger that a heavy investment may suffer premature obsolescence. The same applies to coremaking, which will be discussed in a future article.

Continuous Air Blast Control Improves

CUPOLA OPERATION





SOME years ago the writer was associated with the installation of a new cupola equipped with seven tuyeres, equally spaced around the circumference. All of the tuyeres were fitted with manually operated gates to be closed off in rotation for a short time to prevent slag bridging at the tuyeres. Because the cupola had to be installed close to a building wall, manual operation of the tuyere gates would have been rather inconvenient. Therefore a suitable mechanism for automatic operation was designed and built.

A row of seven specially designed cams was set up on a shaft to engage with a similar row of four-way cam type air valves. Drive to rotate the camshaft at approximately one revolution in 45 minutes consisted of motor, speed reducer and worm and worm gear. Air cylinders to operate the gates were set up at each tuyere as shown in Fig. 1. Connections between air valves at the camshaft and cylinders at the tuyeres were made with copper tubing. Operation of the apparatus is similar to that of an automobile engine camshaft and associated mechanism. The system worked satisfactorily although air cylinders at the tuyeres needed frequent attention on account of proximity to heat of the rear slag spout and also the cupola "drop."

This cupola, with automatic air blast control mechanism, produced a higher carbon pickup than was obtained from an older, conventional cupola of similar size. It was also found that the melting rate per hour could be increased, and that the coke-to-iron ratio could be decreased. Tuyeres were kept free of encrusted slag, and no difficulty was experienced with the "drop."

A conventional cupola and the new cupola operated on alternate days, and charge make-up had to be altered from day to day to obtain iron

Fig. 1 (top)—Original tuyere-closing mechanism

Fig. 2 (bottom)—Improved tuyere-closing device

Continuous cupola blast control offers possibilities of controlled metal analyses, a fast melting rate, a low coke-to-iron ratio and a fluid slag

By E. J. PARKER
Downsview, Ont.

of the same analysis from each cupola. Fig. 2 indicates changes made to the old cupola to make it produce the same as the new one. Air cylinders set up on top of the windbox remained cooler than those at the tuyeres on the new cupola. Camshaft and drive mechanism used was the same as described previously. The redesigned cupola operated quite satisfactory and produced iron of the same analysis as the new one, charge make-up for both cupolas being the same. The relatively small capital charge involved in changing the cupola soon was liquidated.

Reactions Are Rapid—Following the completion of automatic air blast control on the two cupolas, a much more intensive study was made of combustion in the cupola, carbon pick-up and other cupola data. Consideration was given to the fact that more than a ton of air is required in melting a ton of iron, and average conventional cupola air blast usually is relatively low, being approximately 2000 to 2500 cfm. Also, chemical reactions taking place in the iron melting process are exceedingly rapid, materials charged being speedily reduced physically as coke is consumed and thousands of drops of metal trickle down through the coke bed into the cupola well.

Fig. 3 illustrates diagramatically what is meant, assuming a 36-in. cupola to be supplied with air blast at the rate of 3000 cfm when melting iron at the rate of 6 tons per hour. It will be noted that 2000 lb of iron, 240 lb of coke, together with limestone and 30,000 cu ft of air have been reduced or consumed in 10 minutes, which indicates the need for rapid action in applying air blast control to gain metallurgical advantages in addition to the comparatively easy task of avoiding slag encrustation at the tuyeres.

It already has been shown that application of automatic air blast control, using air valves and cylinders to close off tuyeres on a definite rotating time cycle, improved the operation of two cupolas considerably. But the question came to mind—is it not possible to do better, considering that a very rapid continuous chemical reaction is being dealt with? Referring again to Fig. 3, it is shown that a mass of material occupying a space 36 in. in diam x 51 in. high has disappeared beyond all possibility of any form of control in 10 minutes! Under this circumstance it appears that occasional closing of a tuyere or tuyeres is not adequate to meet the situation so that all metal being melted, together with associated slag, may be influenced in the same way by a controlled air blast.

Windbox Divided Into Zones—After considering this matter for some time and developing a few designs which were ultimately discarded, the air blast control unit and typical design application to a cupola eventually appeared on the drawing board as indicated in Fig. 4. The cupola windbox is shown divided into three equal zones with two tuyeres in each, although it must be noted that the number of tuyeres or even rows of tuyeres in each zone makes no difference, all being brought under control in the same way. Each windbox zone receives. in rotational sequence, the full amount of air blast supplied from the blower. Also the design of the control plate is such that regardless of its angular position in relation to the center hub, the same amount of air always is permitted to pass through either one, or parts of two openings, in a transition stage from opening to opening. The check valves and pressure relief valves are a precautionary measure in case explosive gases should escape from the cupola.

With design work completed, the next step was to prove the utility of the apparatus, and for this purpose a 9-in. cold blast cupola fitted with auto-

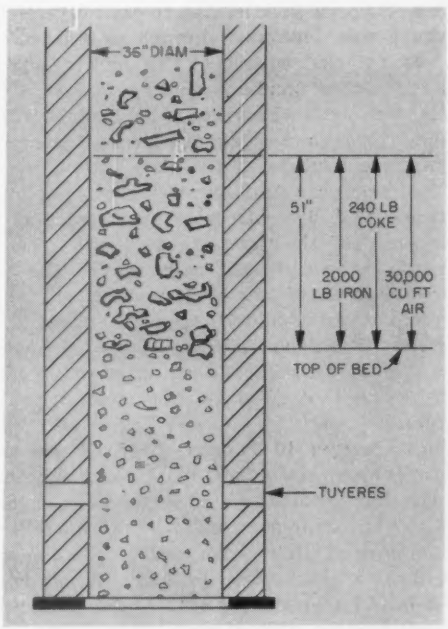


Fig. 3—Sketch shows amount of material reduced to molten iron in a 36-in. cupola in 10 minutes

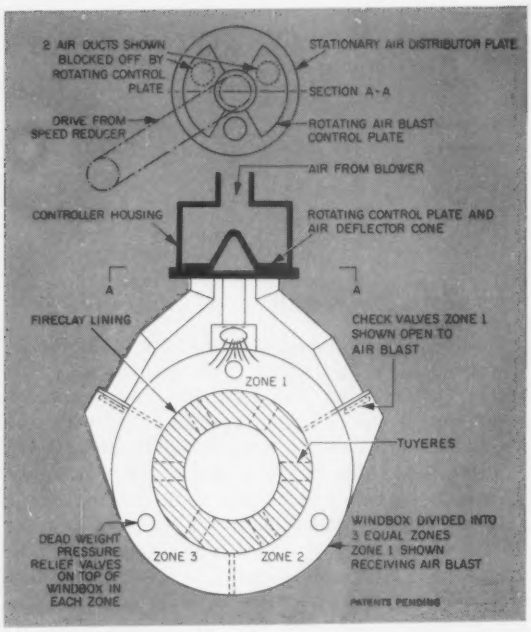

2 AIR DUCTS SHOWN BLOCKED OFF BY ROTATING CONTROL PLATE
STATIONARY AIR DISTRIBUTOR PLATE
SECTION A-A
DRIVE FROM SPEED REDUCER
ROTATING AIR BLAST CONTROL PLATE
AIR FROM BLOWER
CONTROLLER HOUSING
ROTATING CONTROL PLATE AND AIR DEFLECTOR CONE
A
A
FIRECLAY LINING
CHECK VALVES ZONE 1 SHOWN OPEN TO AIR BLAST
ZONE 1
TUYERES
DEAD WEIGHT PRESSURE RELIEF VALVES ON TOP OF WINDBOX IN EACH ZONE
ZONE 3
ZONE 2
WINDBOX DIVIDED INTO 3 EQUAL ZONES ZONE 1 SHOWN RECEIVING AIR BLAST
PATENTS PENDING

Fig. 4—Continuous air blast control unit design

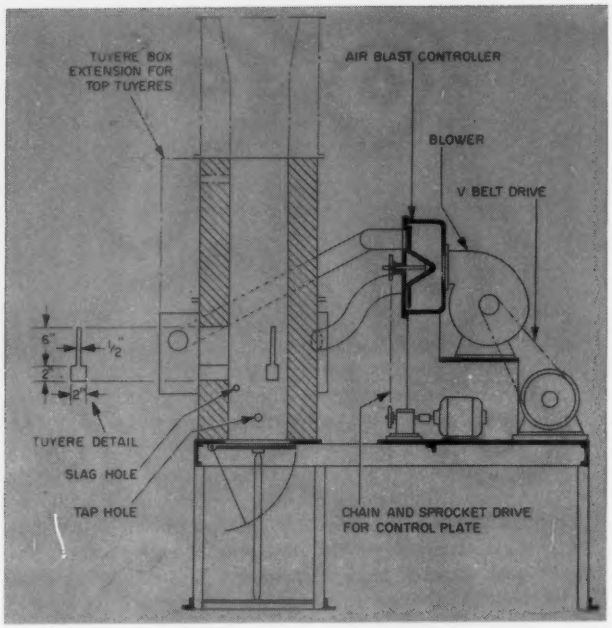


Fig. 5—Setup of control unit on a 9-in. cupola

matic air blast control was constructed. The general arrangement of the assembled equipment is shown in Fig. 5. The 9-in. cupola may be considered as extremely small to be of much practical value. It was felt, however, that if the proposed method of applying air blast control was correct, a 9-in. cupola should operate just as well as a larger one.

Three inverted-tee-shaped tuyeres, shown in Fig. 5, are incorporated in the cupola. Each has an area of 7 sq in., which approximates the area of the 3-in.-diam air duct leading to each tuyere. The tee shape was developed through experience with the two full-size cupolas. The blower provides sufficient air to handle a melting rate of 400 to 700 lb per hour. Provision was made for back slagging through a ⅝-in.-diam hole 1 in. below the tuyeres. Outlets in the blast control air distributor plate are laid out so that the plate in rotating would close off each tuyere twice as long as it permitted the tuyere to be open. With this particular cupola design, only one of the three tuyeres or parts of two in a transition stage from tuyere to tuyere would be open at a time. Chain sprockets of various sizes were provided to rotate the air blast control plate at different speeds so that the resultant effect on iron metallurgy could be studied.

Metal Charges 40 Pounds—In five tests made to date approximately 2500 lb of iron has been put through the cupola. All charges were made up of 40 lb iron (or in some cases 32 lb iron, 8 lb mild steel punchings) 5 lb coke and 1½ lb limestone with about 125 cfm of air to obtain a melting rate of about 500 lb per hour. As might be expected in experimenting with a new piece of apparatus, there were ups and downs, but only once was it necessary to drop the bottom after six charges of this type had been put through the cupola.

With tuyere boxes extended up to the top of the upper portion of the cupola, Fig. 5, three small tuyeres were added, and on this occasion carbon content of iron and steel charged was 2.28. Analysis of the metal produced showed a carbon content of 3.42—a 50 per cent increase. Silicon, however, was reduced 35 per cent. The upper tuyeres in this case were 1¼ in. in diam and were located about 30 in. above the bottoms of the lower tuyeres and 3 to 4 in. below bed height. Hottest iron produced to date was obtained with an air blast control plate speed of about 1 rpm.

On another test with only the tee-shaped bottom tuyeres operating, iron with a 5 per cent carbon pickup and 5 per cent silicon loss was obtained. When a set of modified top tuyeres was operated with the bottom tuyeres, practically no silicon was lost during melting. These top tuyeres were slots ¼-in. wide and about 12 in. long. Although no pyrometer readings were taken on this heat, the low silicon loss would indicate hot iron and good combustion conditions. In only one test was trouble experienced with back slagging.

Control Must Be Continuous—Experimental work done to date clearly indicates that with the system of air blast control used, a cold blast cupola of even the smallest size is a practical proposition. Combustion in the furnace is continuous with the iron melting process; therefore the system of air blast control must be continuous to maintain slag entirely fluid in the plane of the tuyeres so that chemical reactions may proceed efficiently, unimpeded by viscous or encrusted slag. By permitting air to enter only one tuyere or one zone of tuyeres at a time, the major portion of the furnace area is momentarily left to remain at or increase to a higher temperature, and drops of

iron falling down through the bed to the well are not cooled off in passing the tuyere zone. Literature on cupola melting indicates that carbon is picked up at the time of melting, not when metal is lying in the well. Therefore oxygen must be supplied at the top of the bed where melting occurs.

It is further evident that by altering the speed of rotation of the air blast control plate, different temperatures can be maintained in the cupola. Assuming unaltered rate of air blast and charge make-up remaining the same, different metal analyses will result, depending on the temperature at which the furnace is operated. This process parallels to some extent the control maintained in blast furnace operation to obtain pig iron of varying analyses. What effect, if any, apparatus such as has been described would have on a furnace already operating on hot blast is not known.

In the past, foundrymen frequently have discussed sizes and shapes of tuyeres. There is no intention of reviving any discussion here, other than to state that there appears to be strong evidence in favor of vertical disposition of tuyeres or rows of tuyeres. Also high air velocity through the tuyeres appears to have merit. Approximate velocity of air through tuyeres on the 9-in. cupola is 2000 to 2500 cfm, which might be considered excessive for such a small furnace.

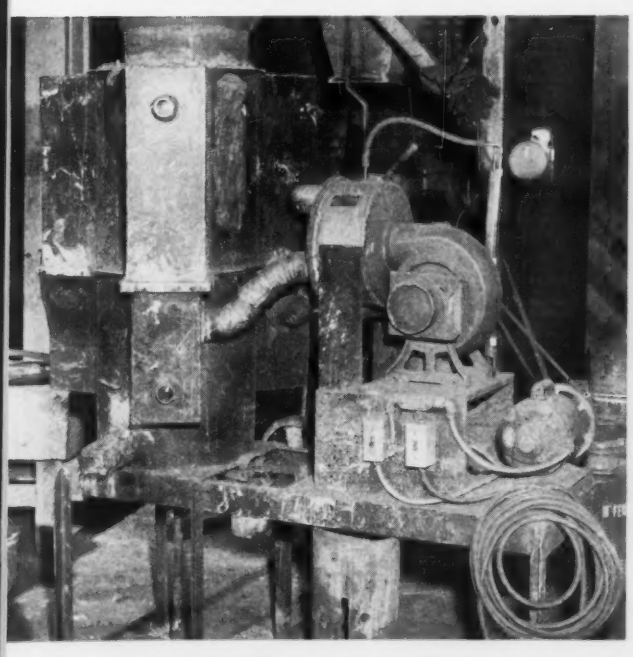
Fig. 6 is a view of one side of the 9-in. cupola. The air blast control plate housing is shown at center just behind the blower. Three-inch pipes carry air to the tuyeres. Sight glasses in the tuyere box permit observation of the cupola interior at upper and lower tuyere levels. The light steel shell on the floor under the air blast control is set in the cupola during ramming of the lining. Wooden blocks are used to form the tuyeres. The tapping spout can be seen on this side of the cupola near the bottom. The other side of the cupola is shown in Fig. 7. As can be seen, a steel drum forms the upper stack. The slag spout also is visible at lower right. Air blast pressure is measured by the manometer attached to the air blast control housing. It registers 7 to 8 in. of water when cupola is operating.

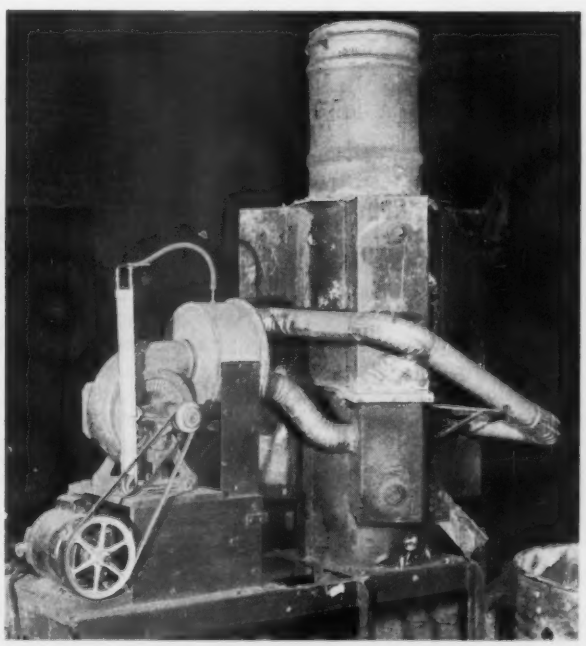
A Practical Tool—The small cupola is a practical tool to build. Most parts can be made in a welding shop. However, principal components of the air blast control unit must be proportioned and machined accurately to achieve satisfactory results.

Additional purchased components which are required are obtainable from several suppliers. The lining should consist of a good grade of high temperature cement, thoroughly rammed and carefully dried. Basic lining may be used if desired. The apparatus should prove useful for laboratory experimental work. Built in sizes somewhat larger than the one which has been discussed, the cupola may have its place in the foundry for special irons required in small quantities.

So far as an existing cupola is concerned, conversion to the type of air blast control described here would be relatively simple and inexpensive. It would aid foundrymen in obtaining improved metallurgy from lower cost raw materials and less coke than otherwise is possible with cold blast. There appears to be no reason why any foundry should have slagging trouble even if back slagging must be used on cold blast cupolas. The air blast control unit can be placed in any position either close to or remote from the cupola. Air inlet and outlets can be accommodated to suit existing equipment layout. Larger cupolas should be capable of producing much better results than those obtainable from a 9-in. cupola.

Figs. 6 and 7—Views of cupola with air control





International Agreement Sought on

Specifications for

In 1955, a committee of the International Organization for Standardization met to discuss international specifications for gray cast iron. An American representative at that meeting reports here on a draft proposal which has been prepared and now awaits approval

GRAY iron castings are being sold and shipped across international boundaries with increasing frequency and in increasing amounts. True enough, such transactions are still a relatively minor part of the foundry business, but they are growing.

When two countries speak different languages, use different units of measurement, and use different standards for their specifications, it is not surprising that international trade in castings (or in any other product, for that matter) can be beset with difficulties and misunderstandings. Furthermore, the exchange of research information between different countries has been (and still is) rendered more difficult and less intelligible by these same differences between countries.

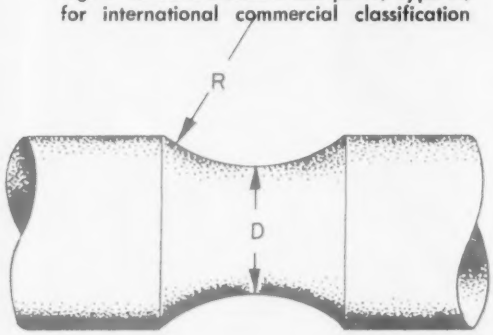
During 1955, the American Standards Association conducted a poll of the gray iron industry. This poll disclosed a general feeling in this country that U.S. representatives should participate as active members in the setting up of the international specifications for gray iron already being considered by Technical Committee 25 of the International Organization for Standardization (ISO/-TC25). The countries participating in the work of TC25 are Belgium, Czechoslovakia, Denmark, Finland, France, Germany, India, Italy, Netherlands, Norway, Poland, Sweden, Switzerland, United Kingdom (Secretariat) and the United States.

After it was established that the United States should participate in this activity, another industry wide poll was made and, as a result, the American Standards Association selected Committee A-3 of the ASTM as its technical representative on ISO/-TC25. Accordingly, in September, 1955, two members of ASTM Committee A-3 attended the first meeting of ISO/TC25 in London, England. These USA representatives were H. W. Stuart, director of quality control, U. S. Pipe & Foundry Co., Burlington, N. J., and H. W. Lownie, Jr., chief, Process Metallurgy Research, Battelle Memorial Institute, Columbus, Ohio.

As the result of three days of discussion, deliberation and compromise, a draft proposal for an international specification on gray iron was prepared, and is now being submitted for approval by the participating countries.

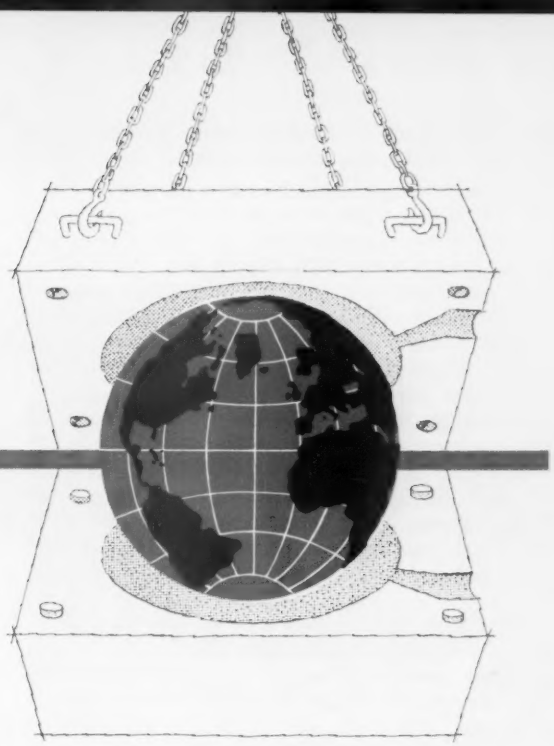
Resembles ASTM Specification—The proposed international specification follows in many ways the pattern of the familiar ASTM A-48 for gray cast iron. As with ASTM A-48, the proposed specification is intended to measure and define the quality and properties of the iron poured into the molds, and is *not* designed to measure or define the properties of the *castings*. In other words, the proposed international specification deals solely with the properties of the iron in test bars.

Fig. 1—Standard tensile test piece, Type A, for international commercial classification



Gage Diameter D				Radius at Curvature R			
Nominal Dimension		Machining Tolerance		Nominal Dimension		Machining Tolerance	
mm	in.	mm	in.	mm	in.	mm	in.
20	0.79	±0.5	±0.02	25	1	−0 +5	−0 +0.2

Gray Iron



By H. W. LOWNIE JR.
Chief of Process Metallurgy Research
Battelle Memorial Institute
Columbus, Ohio

As with ASTM A-48, the international specification leaves the chemical composition of the iron "to the discretion of the manufacturer," unless the manufacturer and purchaser make other arrangements.

In contrast to ASTM A-48, which provides for three or more as-cast sizes of test bars, the proposed international specification deals entirely with one diameter of test bar, and the bar must be cast in "dry sand." The international test bar is cast with a diameter of 30 mm ±1.5 mm (1.2 in. ±0.06 in), with a length dependent upon the type of ends to be used for the machined tensile-test specimen.

Also in contrast to ASTM A-48, the international specification deals only with classification of the test bars by tensile strength. No provision is made for a transverse test, nor is such a test mentioned in the specification. The classification of gray irons in the international specification is solely on the basis of tensile strength in the test bar, and is divided into the seven standard grades itemized in Table I.

TABLE I Standard Grades of Gray Cast Iron as Established by ISO/TC25

Grade	Tensile Strength		
	kgf/mm²	tons/in.²	psi
10	15 max	9.5 max	21,300 max
15	15 min	9.5 min	21,300 min
20	20 min	12.7 min	28,400 min
25	25 min	15.9 min	35,600 min
30	30 min	19.0 min	42,700 min
35	35 min	22.2 min	49,800 min
40	40 min	25.5 min	56,900 min

The listing of grades in Table I may well raise some questions in the minds of U. S. foundrymen. For example, for our purpose on this side of the ocean, it is unfortunate that Grade 30 iron has a minimum tensile strength of 42,700 psi in the 1.2-in. bar. This is a sharp disagreement, for example, with our ASTM A-48 Class 30 iron, which has a minimum tensile strength of 30,000 psi.

Metric System Adopted—On the assignment of grade numbers, however, we have a problem involving different systems of measurement in different countries. Some compromise was called for. Because the majority of the participating countries use the metric system of measurement (kilograms and millimeters), this system was adopted by Committee TC25 as the basis for the classification system.

If the international specification becomes widely used, it appears that we in the USA will have to become as familiar with conversion from kgf/mm² to psi as we are with conversions from °C to °F. Perhaps, however, we can find some consolation in the fact that our friends in Britian will be facing a similar problem because they customarily deal with tensile strengths measured in tons per square inch—and their ton contains 2240 pounds so that even this is not a nice round number.

With further reference to the grades set forth in Table I the U. S. delegation proposed that an iron of Grade 45 (64,000 psi minimum) be included. This proposal received no support from the other countries which seemed to feel that a minimum strength of 56,900 psi was as strong as they would want to commit their foundries to produce. In a like manner, the Swedish delegation received little support for their proposal that a maximum hardness be specified for each grade.

In what appears to be a radical departure from U. S. practice, but seems to make more and more sense the more one studies it, the international specification allows for either of two types of tensile-test specimens to be machined from the standard test bar. The first specimen—Standard Tensile Test Piece, Type A—is intended for use as a basis for the international *commercial* classification of gray cast iron. This is a short specimen as shown in Fig. 1, and is similar to the bar used for control purposes in some U. S. foundries. This speci-

men is designed to minimize machining costs when research-quality data are not required.

The second specimen—Standard Reference Tensile Test Piece, Type B—is intended for use in *research* and as a basis for the *international comparison* of the characteristics of gray iron. This specimen, as shown in Fig. 2, has a reduced-diameter parallel section long enough to accommodate extensometers and other auxiliary measuring devices.

The specification requires that both types of tensile-test specimens be "well machined with a good surface finish." The length of the ends of the specimens is not fixed by the specification, but a minimum diameter of 0.9 in. is set for the ends of plain specimens and for the root diameter of threaded ends. The specification, of course, calls for either type of specimen to "be held by positive grips in such a way that the load is applied axially."

This, then, is the essence of the proposed international specification for gray iron. Some details of other points covered in the specification have been omitted from this discussion for brevity, as have the pros and cons of many controversial points which were discussed by the Committee in reaching its conclusions and recommendations.

Some of the Benefits—At this stage of the game it appears that the U. S. foundry industry has profited in several ways by participating in this activity from the start. For example:

1. The proposed international specification states dimensions in inches and tensile strengths in psi, a condition which probably would not have existed without U. S. participation in the preparation of the specification.
2. The general conditions set forth in the international specification are, in general, consistent with U. S. practices and ASTM specifications.
3. Our foundry friends overseas have learned that the U. S. foundry industry is anxious to co-operate with them, and is willing to compromise on differing points of view for the common good.

The progress to date on this problem, although considerable, leaves much yet to be done. The proposed specification is still to receive formal approval from the participating countries. Beyond this, Technical Committee 25 has on its agenda for the future similar specifications for malleable cast iron and "cast iron with spheroidal graphite." Also to be covered are specifications for pig iron, scrap iron, and steel scrap. Furthermore, methods of testing (especially the tensile test, impact test, and transverse test) are to be studied and considered. The committee also plans to improve international understanding between foundrymen and their customers by giving attention to terminology and definitions. Obviously we have a long way to go, but fortunately the first step has been taken.

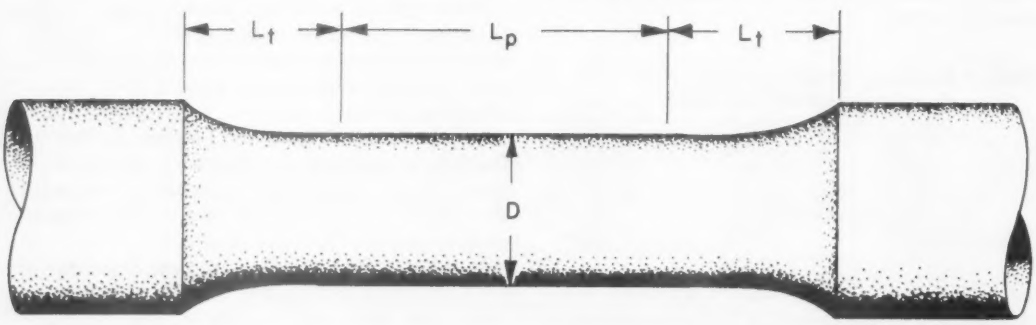
The International Organization for Standardization (ISO) is to all intents and purposes the world's clearinghouse for the development and promotion of international standards. Through ISO, the national standards bodies of about 37 countries co-ordinate their standards in the interest of improving international trade. Technical Committee 25 on Cast Iron is one of about 82 technical committees working on such diversified subjects as fire-fighting equipment, petroleum products, thread tolerances, tires, acoustics, timber, etc.

The ISO has its administrative offices in Geneva, Switzerland. It is a nongovernmental organization.

The American Standards Association (ASA), New York, is the United States member of the ISO.

The American Society for Testing Materials (ASTM), Philadelphia, is a member of ASA.

Fig. 2—Standard reference tensile test piece, Type B, for use in research and for international comparison of the characteristics of gray cast iron



Gage Diameter D				Parallel Length		Length of Transition	
Nominal Dimension		Machining Tolerance		L_p minimum		L_t minimum	
mm	in.	mm	in.	mm	in.	mm	in.
20	0.79	±0.5	±0.02	55	2.2	25	1

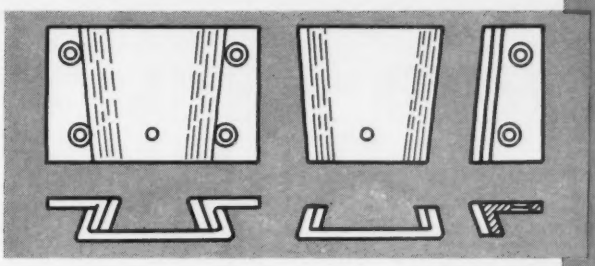


Fig. 1—Dovetail closure is popular because of its versatile application to wooden coreboxes

CLOSURES for COREBOXES

Good corebox closures can reduce operating time and costs. Here are examples of the various types available and their applications

By W. HAGEDORN

MOST coreboxes consist of several parts which must be closed and opened in a continuously rhythmic fashion during coremaking. They require that closing devices be used so that the parts of the corebox are fitted tightly together before the cores are made, whether by hand or machine, and so that they can be taken apart easily afterward.

Design of these devices depends mainly on the type, size and quality of the coreboxes. They must be extremely solid and durable because of the kind and amount of use they receive. When making a new corebox or die, other than a one-piece box, the patternmaker has to furnish them with appropriate closures or clamps. Manipulation of these closures must not require too much time or effort, and the design must facilitate handling of the coreboxes in the foundry.

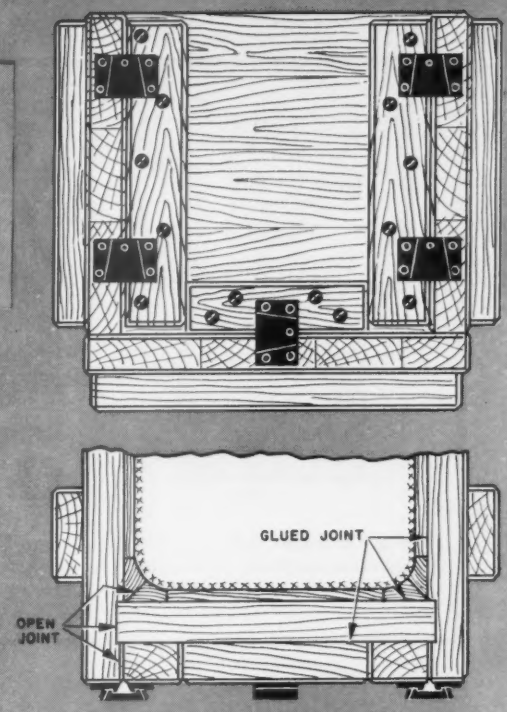
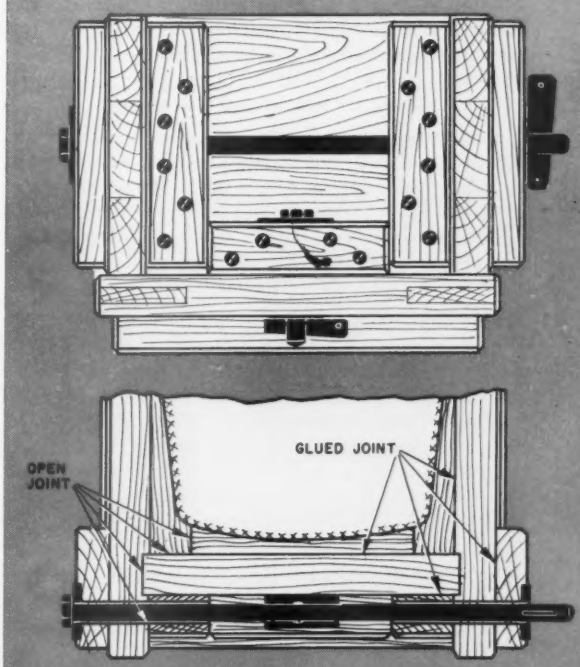


Fig. 2—Mounting corebox with dovetail closure is held together by grooves at the edges. The box can be taken apart

Fig. 3—Heavy-duty corebox is made with strong wedges. These wedges hold single parts of the corebox together tightly



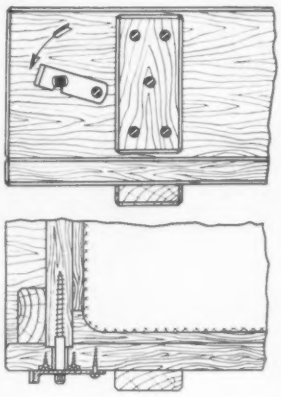


Fig. 4—Edge joint of light corebox with a latch-type closure for simple designs

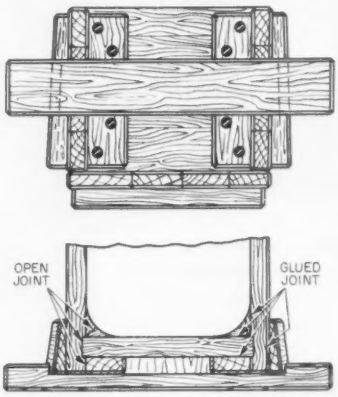


Fig. 5—Simple wood clamp is adequate for production of small number of pieces

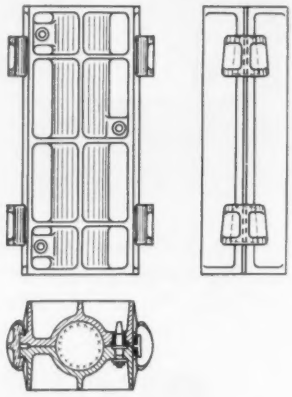


Fig. 6—Dovetail closure for metal patterns often is used but is not always best type

The patternmaker can solve the problem satisfactorily only if he is fully versed in methods of core production and endeavors to comply with the desires of the foundry. In many shops, the importance of good closing devices is not recognized, and their real value is underestimated.

Continuous timing and cost analyses have shown that a good closure can reduce operating time and costs. The lack of suitable closures can be a factor in causing excessive wear on the walls of coreboxes.

The following descriptions of various examples of corebox closures and their applications in practice demonstrate the variety of types available to the patternmaker. It should be recognized that no attempt is made to standardize the applications. It is up to the patternmaker to select the one closure best suited for a particular job.

Closures for Wood Coreboxes

Dovetailed Closure—Fig. 1 shows a closure designed by the German Standardizing Commission. It has proved popular because of its versatile application to wooden boxes. Three sizes are available.

Fig. 2 shows a so-called mounting corebox, medium size, with dovetail closure. The box is held together by grooves at the edges and can be taken apart. Jointing is accomplished by several dovetails. The wooden reinforcements at the front wall must form one plane with front and bottom to screw on the closures. The dovetails are closed vertically.

Wedge-Type Closure—Fig. 3 illustrates a heavy-duty corebox with strong wedges. These wedges hold the single parts of the corebox together tightly. Even at continuous output, they guarantee accuracy of cores with respect to gage. The round, iron bolt has a milled slot to take the wedge and a bolthead as support. Both sides of the box (the sidewalls) are reinforced at the borehole by a steel plate to prevent early wear of the wood. The wedges should be fastened to the box so that they cannot be lost. The bottom of the box can be held together in the same manner.

Latch-Type Closure—Fig. 4 shows the edge joint of a light corebox. Its application is for simple designs only. The shoulder stud is flattened for screwing and has a groove for the latch. The center of rotation of the latch should be laid toward the middle of the box to provide sufficient space for shutting. An inset steel plate protects the wood.

Wooden Clamp — A simple, inexpensive wood clamp (Fig. 5) provides enough stability for the production of a small number of pieces. This clamp may be preferred over screws because screw driving makes too much work for the coremaker and because accuracy of the cores is endangered by loosening of the screws after even relatively short use.

Closures for Metal Coreboxes

Since metal coreboxes nearly always are constructed for production jobs, it is vital that they incorporate practical closures. Easy manipulation is essential for quantity production and economy of operation. In the design of these closing devices, the patternmaker must provide for eyebolts, cams and reinforcements in the master pattern.

Dovetail Closure—This type of closure (Fig. 6) often is used in metal patternmaking and has proved very capable in practice. Its application cannot be generalized, however, because it is not suitable for all purposes. Since too many loose parts are disadvantageous, it should be considered whether a better solution exists for a given purpose.

The dovetail key should be of steel or malleable iron to withstand the continuous hammering it will undergo. The milled flanges onto which the dovetail key is slid are cast into the box. To avoid damage when the key is put on with a hammer,

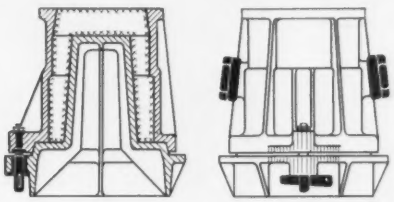


Fig. 7—The wedge-type closure is particularly suitable for small cast aluminum boxes

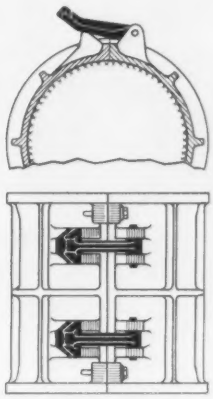


Fig. 8—Clasp closure for heavy construction is used only for mass production

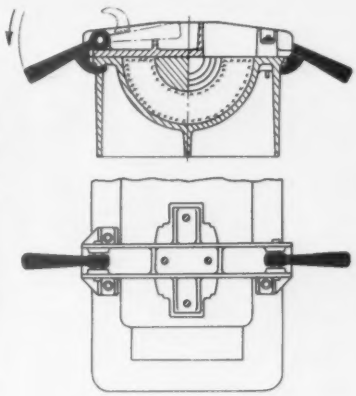


Fig. 9—Clamp closures for use in half-coreboxes clip bridge firmly to corebox

the flanges should be shorter than the key. Sufficient space for opening and closing should be reserved when the dovetailing principle is used.

Wedge-Type Closure—This closure, shown in Fig. 7, is particularly suitable for small coreboxes cast of aluminum. Preferably, it is used when only a little space is available for the closure, for it can be installed inside and outside the walls of the corebox. The wedge also can be used to fasten a drier shell or plate. Guide pins are of steel with a slit for the key, and a steel flange bushing is advisable. Long guide pins guarantee an accurate lift of the upper part of the corebox. The key should be fastened to the box by a chain or wire.

Clasp Closures—The clasp closure illustrated in Fig. 8 has proved its worth for heavy construction. Since it is relatively expensive, however, it is used exclusively for mass production work. This type of closure is used widely for chill casting. Because it is subjected to continual high stress during opening and closing by hammer, the clasp must be of a durable material, such as cast steel. The clamping eye and the jaw are cast to the corebox. This solid construction is to prevent their being torn off. For larger coreboxes, two or three clasps can be combined by a cross-arm so that handling is quicker.

Clamp Closures—Loose inlays in half-coreboxes which are to be removed in the direction of the open part of the mold generally are fixed to a so-called bridge which must lie close to the mold. To insure that the bridge is not lifted while a core is made, the bridge is clamped to the corebox by two clips (Fig. 9). The handles are pivoted on both sides of the bridge, and their hooks grip into a slit when they are pressed down. Light pressure by hand is enough for opening and closing. This type of closure also can be used for small coreboxes in two parts.

Grip Closure—This type of closure, shown in Fig. 10, has proved suitable for quantity production of small to medium-sized cores. Halves of the corebox can be closed tightly by hand and can be opened again easily. Since the small closing lever has the same ascent as the eye, it glides on constantly and shuts. Fig. 10 shows a corebox with exhaust port for motorcycle cylinders. These cores are made with resin binder. With these closures, two separation joints are closed simultaneously and separated by a wedge. In boring coreboxes, the center of rotation of the closures is laid inward so that they do not take much space and are protected against wear.

These comments on corebox closures have dealt with the problem from the viewpoint of the foundryman. It should be emphasized, however, that foundryman and patternmaker should co-operate closely to develop the best tools. Every simplification in the production method helps everyone concerned.

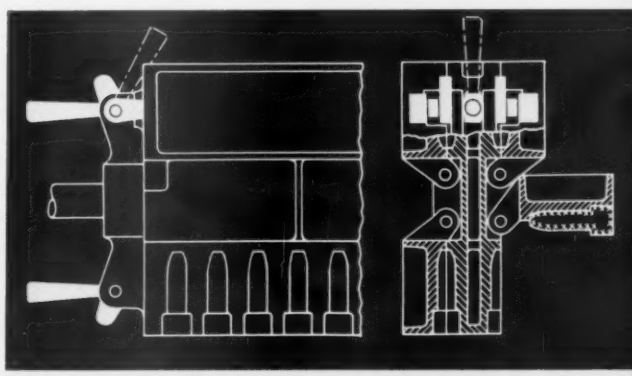
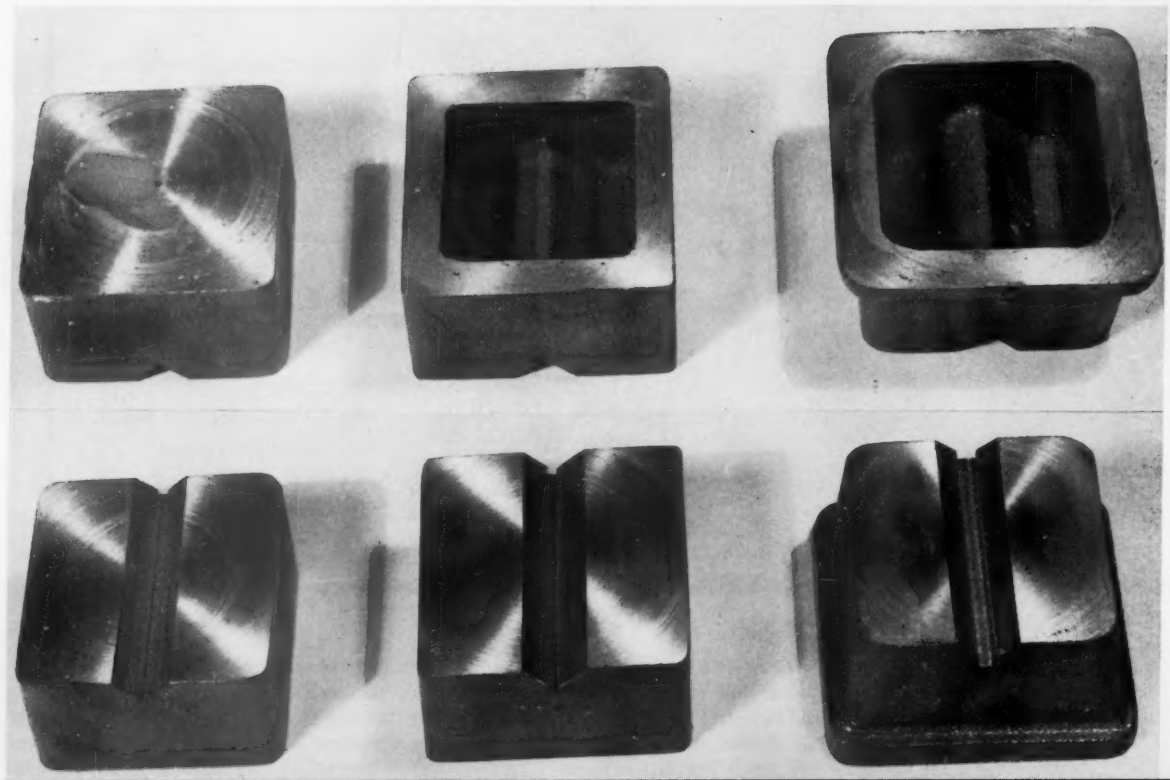


Fig. 10—Grip closure has proved suitable for quantity production of small and medium cores



CASTING DESIGN ... A Teaching Method

Deciding to make a given part as a casting is only the first step for engineering students at University of Washington. Here's how they decide what casting process to use and how to design the part for it

By L. B. ZYLSTRA and W. A. SNYDER
University of Washington
Seattle, Wash.

THE production courses taught in the Mechanical Engineering Department at the University of Washington include a group of three classes in manufacturing methods. These three are commonly called the "basic shop" courses. They include metal casting, welding, and metal machining and are taught with the use of both lecture and laboratory instruction.

The courses have one objective in common—to better enable the engineering student (later the engineer) to make the proper selection among available manufacturing methods to accomplish a given job and to enable him to design intelligently by giving him the ability to direct his design toward the "one best method" of manufacture.

This objective is considered to be of primary importance in the education of an engineer regardless of his specialty. Obviously, it is impossible to design anything effectively and economically without first knowing whether or not the product can be manufactured and, secondly, designing to facilitate a specific manufacturing method.

It is not enough that he know, for instance, that his product lends itself well to casting; he must

also know which of the many casting processes is best suited to it, what equipment and techniques are involved, and how the part should be designed to be best suited to the process. This knowledge is essential so that the product will perform its intended function, will have the desired quality, and can be delivered on time at the least possible cost.

The classes mentioned must of necessity operate on a very strict time budget. Consequently, it is necessary for the instructors to be constantly critical of their teaching methods and attempt to develop more effective techniques. After a great deal of trial and error, the following procedure was arrived at in the casting design lectures of the metal castings course. The class selects, from a group suggested by the instructor, an object which it wishes to "produce for sale" during the forthcoming term. This selection then becomes the course project and is the kit of tools that the instructor uses to get his points across.

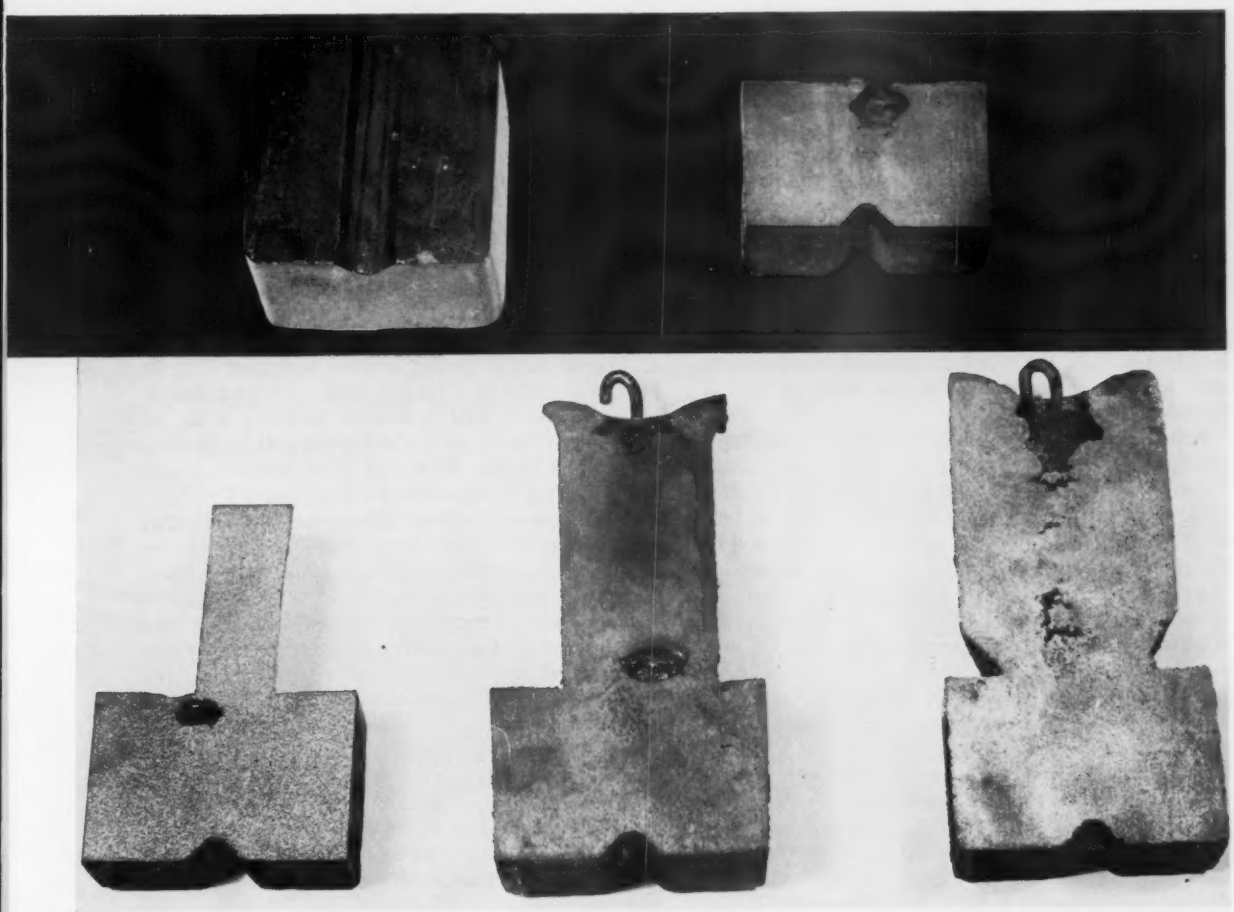
How the Plan Operates—Take as an example the product developed by a recent metal castings class. The object is a simple V-groove bench block of the type used by mechanics for supporting round stock while drilling, knocking out taper pins and rivets, and similar jobs. The first discussion concerned the various processes by which the object could be manufactured. These included forging, fabrication by welding, machining a piece of torch-cut steel plate, and machining a piece of barstock for a cylindrical model. Since this was a metal castings course, these other possibilities were not explored fully and the discussion returned to casting as the process to be used, and gravity sand casting was chosen as the specific method.

Fig. 1 shows the completed castings from the three designs which this class considered. These designs were analyzed carefully and it was agreed that functionally they were all adequate and offered little choice from the standpoint of ability to meet a delivery date. This left only cost and quality as the governing factors. (The term quality is used here loosely to include such things as customer-appeal, quality of cast material, ability to stand up in service, etc.)

After a thorough discussion of the three designs, including time and cost predictions, the

Fig. 1—Left to right, castings 120, 121 and 122 were considered for the bench block design

Fig. 2—Top row, pattern 120 and casting 120A. Bottom row shows castings 120B, 120C and 120D



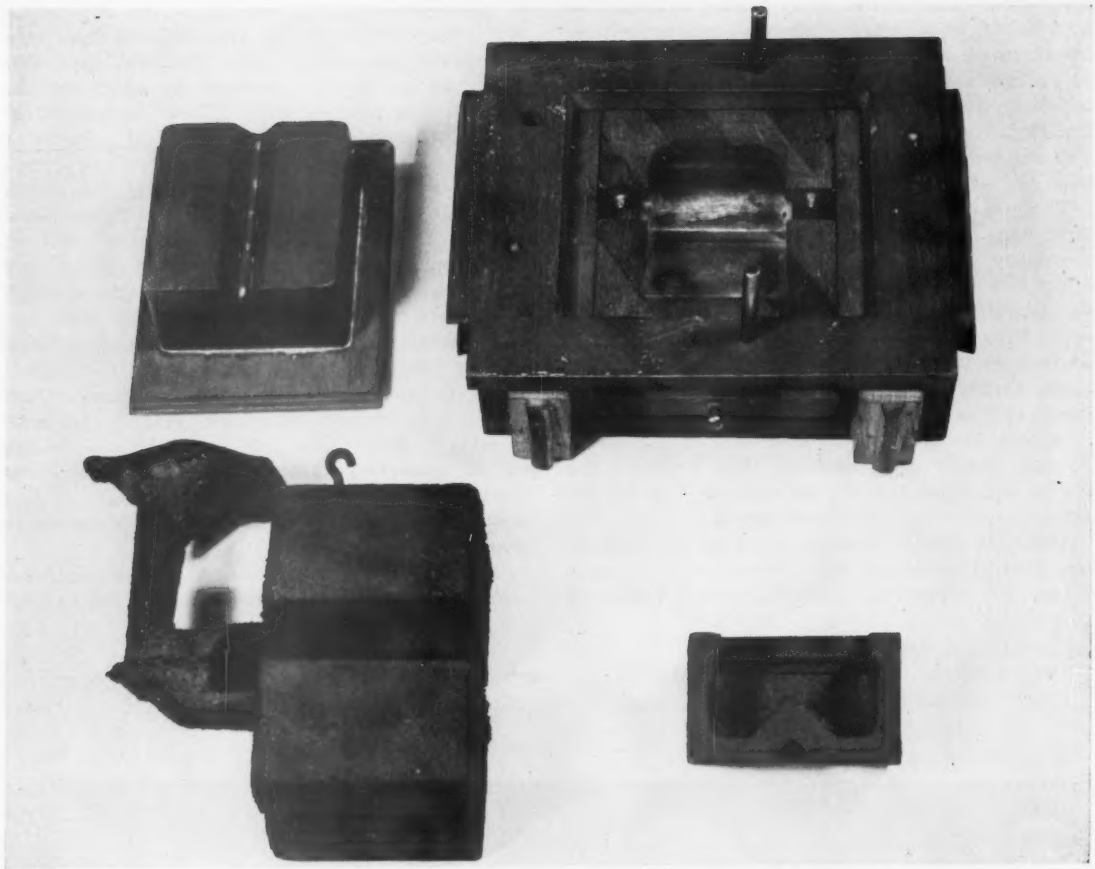


Fig. 3—Top, pattern and corebox for casting 121. At the bottom are cope and drag castings and a sectioned casting

drawings were turned over to the patternmaker to make pattern equipment for each design. During the subsequent laboratory periods these patterns were used by the students to make molds and castings. The castings then were sectioned, examined, and tested. As the work progressed, comparative cost analyses were made on the basis of actual laboratory work.

Solid Block Simplest—Fig. 2 (Pattern No. 120) illustrates the first possibility, a solid cast block. From a patternmaking standpoint this is the simplest of the three and the least costly. Casting 120-A is shown here in section, and the result of solidification shrinkage is obvious. It was pointed out that this casting might satisfy the functional demands of a bench block in normal usage, although a heavy blow would probably cause failure. It was reasoned however, that our customer would be inclined to avoid this product unless the shrinkage was not evident externally. It was assumed arbitrarily that a sound casting was desired, and the illustration shows the extent to which the feeder size was carried to produce a casting without visible shrink defects. Note that casting 120-C has a feeder that was almost large enough to do the job, but considerable sponginess found under the feeder was considered to be objectionable.

The students were thus confronted by the concept of yield in the foundry. It was recognized immediately that the extra cost occasioned by melting and handling metal for the feeder could be an appreciable item. Casting 120-A has a net weight of 7¼ lb and a gating system weighing 2⅝ lb. This is a yield of 73.5 per cent. Casting 120-D, however, has a gating system weighing 8 lb, including the feeder, or a yield of only 47.5 per cent. In addition to the difference in yield there is also the extra cost of removing feeders.

Core Reduces Section—Discussion of the feeding problem in the above terms suggested to the students the desirability of reducing the section thickness by coring the casting. Fig. 3, with pattern No. 121, shows this design change. Here we have a somewhat more expensive pattern. We have also necessitated the construction of a corebox, No. 121, and the mixing, molding, and baking of a core for each casting.

The box itself is complicated, and the coremaking involves the removal of two loose parts prior to drawing. This operation, of course, increases the time required to make each core. The design does, however, give a sound casting of uniform section thickness, functionally adequate and pleasing in appearance.

The pattern may also be doubled up and used as a split pattern to cast one block in the cope and one in the drag for nominally the same expenditure of molding labor. This is shown by the casting at the lower left. It is pointed out, however, that the advantage thus obtained may be nullified if the quality of the working surface of the bench block is a critical factor, because of the tendency for loose sand, slag, and other impurities to accumulate on the upper surface of the cope casting. This circumstance was illustrated to the students by a comparison of the working surfaces of cope and drag castings.

At this point in the discussion the suggestion was made that the need for a dry-sand core could be eliminated by reducing the turned-in base of the bench block to the thickness of the skirt. It was pointed out, however, that this reduction of the support surface probably could not be to the liking of the customer on the basis of function, particularly if the block were to be used on a wood-topped bench. Also, an internal draft of some magnitude would have to be provided to allow manual draw on a hanging cope of this depth.

Pattern More Expensive—Fig. 4 shows the third design. It incorporates the changes mentioned in the preceeding paragraph but has the base turned outward to maintain an adequate supporting area. Pattern P-122 was more costly to make than either P-120 or P-121 and is also easily damaged by ramming or dropping. More molding time and casting losses were experienced due to faulty ramming of the cope and consequent repair time and also to drops. The use of gaggers to reinforce the hanging cope in order to combat these faults was considered, but it was necessary to point out that experienced molders would normally have no difficulty with a pattern of this kind.

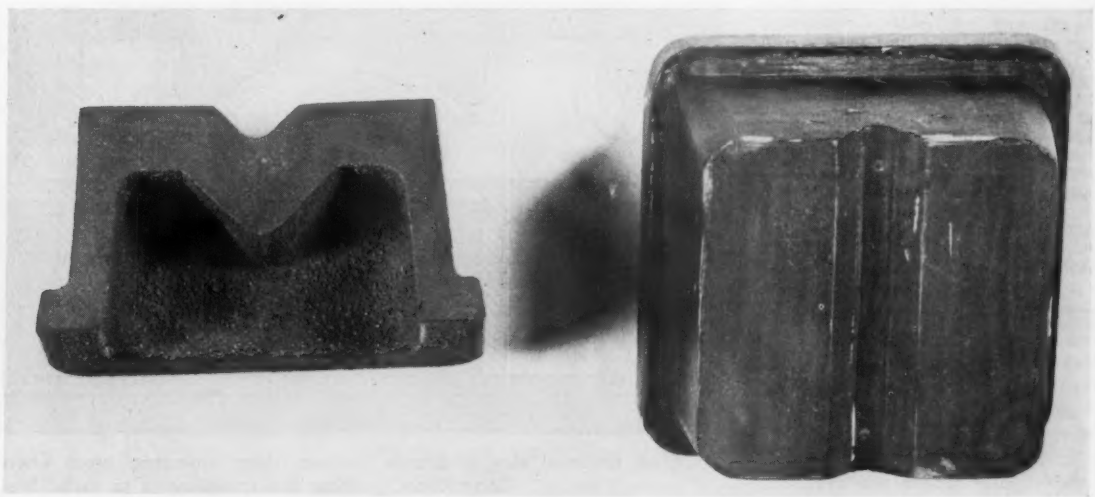
A casting produced with this pattern was sectioned (Fig. 4) and it was noted that the rule of casting design which advocates a uniform section thickness wherever possible had been violated (in this case by the patternmaker who failed to follow drawing dimensions). The top is thicker than the skirt or the base and uses an unnecessary amount of metal. Also a small amount of sponginess is apparent in the heavy V section.

Three designs for the bench block had been examined. Which was the best? Based on the ability of the casting to perform its intended function there was evidently nothing to give preference to any one of the three. On the basis of quality the class was less certain because this factor included such intangibles as appearance. Assuming adequate delivery time for any of the three models, the class based its decision finally on cost.

The lecture material connected with this phase of the course also included, naturally, those principles of casting design which were not brought out directly by the example chosen. This method of instruction must limit itself, for obvious reasons, to the use of very simple examples, a single one of which cannot illustrate all the principles of casting design. It was found, however, that the use of such examples in the manner described is surprisingly effective in stimulating and maintaining interest in the over-all design problem.

It is sincerely felt by those connected with the teaching of these courses that an engineer who has been exposed to this type of instruction will never execute or approve a design drawing without a full realization of how that drawing fits in with the men and the equipment that must produce the object. He will be conscious, as a casting design develops, of pattern costs, cost of coreboxes, coremaking costs, molding costs, yield, cleaning costs, machining costs, the influence of the number of castings desired on cost and methods, adaptability to mechanized molding, the effects of design change on quality of the cast metal, and many other related factors which he might otherwise have ignored. In short, he will have a better chance of coming up with the best design for "the one best method" of manufacture.

Fig. 4—Left, sectioned casting 122 and, right, pattern for 122



Questions and Answers

Molds and patterns may be formed by electroplating thin shell of copper on a suitable replica . . . Cupola may be operated for short period each day . . . Gray color due to anodizing . . . Iron casting may be made in metal mold . . . Pressure-cast matchplates

Form Mold by Electroplating

QUESTION We have seen references to electroformed molds and patterns, and would like to have information on the process.

ANSWER Electroforming in general requires a plaster of paris or wax model or pattern. If plaster is used it usually is coated or impregnated with wax to prevent absorption of the plating solution. It then is carefully coated with fine graphite to provide a conducting surface and made the cathode in a copper plating bath.

Instead of waxing the plaster model, or if it is made of wood, another method may be employed. It consists of applying two coats of shellac by dipping, and then spraying on a thin lacquer containing metal powder. One suggested mixture is composed of 1 fluid ounce of nitrocellulose lacquer, 7 ounces of lacquer thinner and 2 ounces of copper-bronze powder. The comparatively thin shell formed by the electrodeposition is backed up by a white metal alloy containing considerable antimony which is low in shrinkage.

Faucet Casting Develops Leaks

QUESTION For your examination we are forwarding a casting which we have been making for many years without any difficulty. Recently when we made this casting we ran into some trouble with the casting leaking, as indicated by the blue dye. To the best of our knowledge we used the same foundry procedure as in the past. The casting is gated at the ends of the water inlets of the faucet casting. Alloy used contains 80 per cent copper, 2.90 per cent tin, 7.90 per cent lead, 8.87 per cent zinc, 0.03 per cent nickel and 0.07 per cent iron. Pouring temperature was 2150°F.

ANSWER Leakage in the area indicated, the seat location, is due to a shrinkage condition, as may be observed by fracturing the casting at the section. We believe that this trouble is due to the method of gating in that the cross-sectional area at the vicinity where the difficulty occurs is constricted and impedes the metal feed. By the constriction we mean the enlargement of the core just below the seat which decreases the wall thickness of the water inlet, and the necking down of the water inlet where it joins the body of the casting.

Probably when all conditions such as metal temperature, pouring rate, etc. are just right, castings are obtained where the shrinkage is confined to a narrow central area which is not reached by machining operations, and thus does not permit leakage. Perhaps your pouring temperature is too high, and some measure of success might be obtained by reducing it to the point just above that where cold shuts tend to occur. Such procedure probably will limit the number of molds that can be poured from a crucible full of metal.

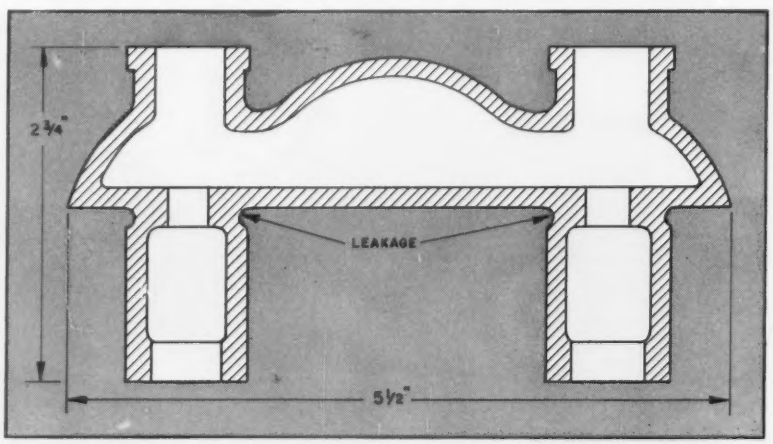
Again it may be that by eliminating the necked-in portion or groove where the inlet joins the body and making the core of the inlet the same diameter from the print up to the seat, you might be able to overcome the leakage problem. If these changes do not produce results, then regating will be required. We suggest trying a flat gate about ¾ x ⅛-in. located in the middle of the back of the body of the casting. While its location makes it a little harder to remove than in the present method, it can be cut off close to the casting by a sprue cutter knife and the small stub touched up with a grinding wheel. The gate in the center should distribute cooler metal to the outer sections of the casting and permit them to set up fast and solid.

Run Cupola for Short Heats

QUESTION In our foundry in Central America we are producing 65 to 70 tons of sugar mill and other castings, and are pouring once a week. The cupola lined to 54 in. melts 10 tons an hour. Major portion of the work is in heavy rolls weighing around 12 tons, and we are wondering if it would be possible to operate this cupola every day instead of once or perhaps twice a week. Due to the heavy castings it is necessary to use this size cupola as holding time with a small cupola would be too long, and the iron would get cold.

ANSWER There are many foundries in this country which have only one cupola which is operated every day and some of those melt 15 to 20 tons per hour. The cupolas only are operated in the afternoon as patching the lining followed by charging with the raw materials occupies the morning. Patching usually does not require more than a couple of hours. Melting time may range from 1 to 4 hours depending on the melting rate of the cupola and the tonnage to be poured.

Burnout in cupolas which only op-



Cross sectional view of bronze bathtub faucet indicating areas where leakage occurs. Constrictions at those are impediments to metal feed

erate a few hours is not great, and as indicated previously the patching operation does not take as long a time as in the case where the cupola is in operation for 8 hours. By running a few short heats you can determine the burnout and the time required for bringing it back into shape.

In operating your 54-in. cupola you would of course have to set up sufficient molds to take care of the iron melted during the period of operation whether it be 1 or 4 hours. That should not be difficult since one roll for example would take over an hour's production, and sufficient smaller work could be provided to absorb the remainder melted in a half hour. In other words with melting for 1½ hours per day you could take care of 75 tons of castings in a 5-day week.

Coating an Aluminum Casting

QUESTION We have the opportunity to convert an aluminum sheet fabrication to a casting if we can overcome a small problem. The aluminum sheet has a dark gray surface which is desirable since it later is engraved, and the bright surfaces of the tooled characters stand out sharply against the background. Can you suggest a method for obtaining the gray color?

ANSWER Apparently the gray color on the sheet material is obtained by an anodizing treatment, a number of which are used in practice. Probably the most common are the sulphuric and chromic acid procedures. With both methods the castings must first be cleaned carefully to remove any oil, grease or dirt. Use a hot, mild alkaline solution for this purpose. The castings then are rinsed thoroughly in cold water, preferably running water. After rinsing, the pieces are made the anodes in the anodizing bath.

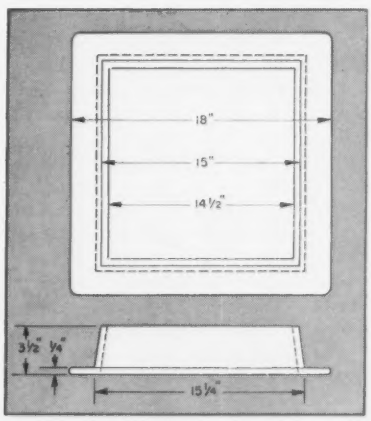
The chromic acid bath is a 5 to 10 per cent chromic acid solution maintained at a temperature of about 95°F. Low-voltage dc current is applied initially and increased as rapidly as possible to 40 v. Current density varies from 1 to 5 amp per sq ft. After reaching the desired voltage, the castings are treated for 30 minutes at that potential, removed and rinsed in hot water at 180 to 212°F to seal the oxide coating.

Usual sulphuric acid bath contains from 10 to 25 per cent acid and is maintained at 70°F. Voltage used ranges from 15 to 20 volts dc and the time of treatment is 20 to 30 minutes. As in the previous case, castings are removed and rinsed in hot water to seal the coating.

Could Use a Permanent Mold

QUESTION We are enclosing a sketch of a simple casting we are about to place in production at the rate of about 20 per heat on a continuing basis for some time to come. We have decided that the method for lowest production cost would be to set the job up on one of our jolt-squeeze, pin-lift machines and purchase 20 sets of flasks. Do you agree? However, the question came up that since the design of the casting is simple it might be made in a permanent mold. If a permanent mold were used would the casting have to be annealed or could we pour an iron which would be self-annealing? If so what composition would such an iron have?

ANSWER To answer your last question first, it would be possible to produce the frame casting in a permanent mold, but in view of the quantity required, we believe it would be an expensive method. By careful control of pouring temperature, mold temperature, and cycle of operation, it would be possible to produce castings with a gray structure as demonstrated by a commercial installation in England, which is manufacturing cast iron gutters or eaves troughs in 6-ft lengths.



Simple frame casting may be made in a permanent mold if production warrants

This process is termed "die-pressing" and some of the details are available in an article "Die-pressing of Gutters" by R. S. M. Jeffrey in the Oct. 31, 1954 issue of the British *Foundry Trade Journal*. Iron composition is given as 2.6 per cent Si, 0.8 per cent P, 0.5 per cent Mn, 0.1 per cent max S, and 3.3 per cent TC. Temperature of the metal in the die or mold is above 2372°F. Cycle of operation is controlled automatically, and a casting is produced every 90 seconds.

With reference to the green sand molding method you propose, we wonder if you have considered a snap-flask operation with a shell pattern and a shallow drag about 2 in. thick at the edges with the sand mound to form the tapered sides in the center of it. Additionally the center of the mound as well as its counterpart in the cope could be hollowed out by use of a wood block or metal shell during molding to leave a wall of sand about 3 in. thick instead of the solid mound.

Pressure Casting Matchplates

QUESTION We are interested in obtaining information on the practices employed in manufacture of pressure-cast matchplates, and wonder if you could supply it.

ANSWER Briefly the production of pressure-cast matchplates consists of making the requisite number of half-molds from the pattern. They are made of plaster and assembled face down, with the desired spacing, on a glass-topped table. Glass is preferred since it is flat, smooth and not affected by the plaster.

The half-molds are surrounded by a frame or flask of the desired dimensions. Usually the molds are weighted to hold them in place and then liquid plaster is poured around and over them to form an integral or single mold. If the plate is to be single face, a flatback of plaster is made to form the cope. If the plate is to be double-face, another set of half-molds is made, turning the pattern over if it is not symmetrical.

Gating system for the patterns on the matchplate as well as that to feed the matchplate is tooled in the plaster mold. The plaster can be cut easily with gouges and other tools while it is damp. The two molds or mold and flatback are

placed in an oven and dried thoroughly at 400 to 600°F for 10 to 14 hours. Molds are taken from the oven and, while still hot, are assembled, using asbestos board strips of the same thickness as the desired plate as spacers between the two molds. End spacers usually are contoured to form the ears on the plate.

The molds are clamped together carefully to prevent any springing, and then the metal-pressure chamber is set over the sprue and clamped. A thin asbestos disk about 1/16-in. thick is placed between the opening in the chamber and the sprue. Pressure chamber is cylindrical and of such dimensions that it will hold all the aluminum required to pour the plate. Top of the chamber is flanged so that a cover can be clamped on, and the cover contains an opening so that it can be connected to the shop compressed air line.

Pressure chamber is filled with the proper amount of aluminum, and the cover clamped on. The metal is allowed to cool to about 1130°F, and then about 4 to 6 psi air pressure is admitted to the pressure chamber. This pressure causes the metal to puncture the disk and flow rapidly into the mold at higher than atmospheric pressure. For further details on the process we suggest a study of the following articles which have been published in FOUNDRY:

"Pressure Casting Aluminum Matchplates"—July, 1945; "Pressure Casting Matchplates"—April, 1947, and "Pressure Casting Aluminum Matchplates in Plaster Molds"—July, 1948.

Wants To Spray Metal Coating

QUESTION We are interested in obtaining information on process and equipment to spray metal. The alloys we use are copper-base and aluminum-base. We will appreciate any help.

ANSWER Metal spraying or metallizing, the terms preferred by its advocates, is being employed for a wide variety of purposes including corrosion protection, building up worn or undersize surfaces, applying hard materials for wear resistance, for decorative purposes, etc. Metal coating may vary from a few thousandths of an inch thick up to quite appreciable thicknesses.

Spraying or metallizing is accomplished with two types of equipment. One uses the metal or alloy to be applied in wire form and the other employs the material in powder form. Process may be used for application of a wide variety of metals and alloys including lead, tin, copper, aluminum, zinc, low-carbon steel, stainless steel, hard-facing alloys, etc.

To insure proper adherence of the metal coating, careful preparation of the surface is required. Cleanliness is essential since the surface must be free from oil, grease, finger marks or other contamination so that the coating will not peel. Surface should possess some roughness for good adherence, and that may be accomplished by abrasive blasting, rough machining and other procedures which have been developed by the manufacturers of metallizing equipment. Details on procedure and operation of the equipment may be secured from the various manufacturers.

Encounters Pinhole Trouble

QUESTION We are having some trouble with certain of our aluminum alloy castings in that tiny pinholes appear on the surfaces when they are polished. We use the 214F aluminum alloy which is melted in crucibles with gas for fuel.

ANSWER We surmise that your pinholing trouble is due to gas absorption or air entrainment or high pouring temperature, or possibly a combination of these conditions. Since a number of possible causes are involved, we suggest that you investigate one at a time rather than make several simultaneously. The latter procedure may result in a temporary cure, but because the real source of trouble was not determined, you probably will be back in the same boat again.

Our suggestion is to start with melting and pouring temperatures. Establish by use of the pyrometer the lowest pouring temperature range which will produce sound castings free from cold shuts, and see that it is adhered to by the pouring crew. From these data you can set up the melting temperature range by determining the temperature drop between furnace and mold side, including skimming time. Also see that the alloy is not allowed to stew in the furnace after the desired temperature is reached. Furnace atmosphere naturally should be slightly oxidizing.

Next step is to see that agitation of the alloy is kept to a minimum in skimming and pouring. In skimming see that the tools used are clean and dry. Use a slow pumping motion of the skimmer below the surface so that the latter is disturbed as little as possible, and keep the operation to the minimum. In pouring keep the lip of the crucible as close as possible to the sprue opening, and see that a steady unbroken stream of metal flows into the mold. If the metal stream has to fall from any appreciable height there always is the possibility of air entrainment due to the characteristics of a falling stream.

If the sprue is located so that the crucible lip has to be at a considerable elevation for pouring, it is advisable to change the sprue location to a more favorable position, or use a pouring basin which extends to or close to the flask edge. See that the sprue is choked sufficiently so that it may be filled rapidly and kept full of molten metal. Possibly the substitution of square or rectangular tapered sprues for the round type will eliminate air entrainment.

Grinding Ball Compositions

QUESTION We are interested in manufacture of cast balls for grinding copper, lead and zinc ores, and are trying to obtain information on the best compositions for steel and iron balls to provide high wear resistance.

ANSWER Grinding balls for reduction of ores and other materials are made in a variety of compositions. Opinion as to the most suitable composition for cast steel balls varies as indicated by the following: For mild impact conditions—0.80 per cent C, 0.80 per cent Mn, 0.30 per cent Cu, 1.0 per cent Cr and 0.25 per cent Mo. For severe impact conditions—1.10 per cent C, 0.80 per cent Mn, 1.50 per cent Cr, 0.30 per cent Cu, and 0.25 per cent Mo.

Another composition contains 1.10 to 1.40 per cent C, 0.60 to 0.80 per cent Mn, less than 0.80 per cent Si, 0.90 to 1.25 per cent Cr and 0.20 to 0.30 per cent Mo.

In the cast iron ball field the spread of compositions is still greater and ranges from alloy-free white iron to those containing apreciable amounts of alloys produced in green sand and permanent molds.

One alloy type shows 1.10 per cent Si, 0.80 per cent Mn, 3.70 per cent TC, 0.60 per cent Cr and 0.30 per cent Mo. Two nickel-chromium bearing types show 0.4 to 0.7 per cent Si, 0.4 to 0.7 per cent Mn, 3.0 to 3.6 per cent TC with 4.5 per cent Ni and 2.5 per cent Cr in one case and 2.50 per cent Ni and 1.25 per cent Cr in the other.

In alloy-free cast iron balls the silicon usually is 1 per cent or under depending upon ball size.

CONVEYOR BELTS

NEW U.S. TYPE HTB GLASS FABRIC BELT

Eliminates Shortcomings of Other Hot Materials Belts

Up to now, every hot materials belt—carrying such materials as hot sand, cement clinker, hot char, hot sinter—has suffered from one or more of the following:

- premature splice failure,
- low abrasion resistance at elevated temperatures,
- accelerated heat aging at elevated temperatures,
- poor adhesion and abrasion of untreated glass carcass.

But now, all these unsatisfactory qualities have been eliminated by the *new* U.S. Rubber *HTB* Glass Fabric Belt. This belt has been thoroughly tested on the job and has given maximum performance under maximum operating temperatures. That's because both cover and carcass have been engineered to stand up to really rugged, really hot conditions.

Specially Compounded High-Temperature Butyl Cover and Specially Constructed All-Glass Carcass

This new belt contains a heat-resistant cover of specially compounded high-temperature butyl rubber, developed particularly to withstand exceedingly high temperatures.

Under the cover, "U.S." provides an exclusive all-glass carcass, woven to be self-cushioning and to eliminate internal abrasion. The all-glass carcass maintains full strength throughout the longer life of the belt and gives life-of-the-belt adhesion without special treatment. The *new* U.S. *HTB* also provides superior flex life, fastener-holding strength, heat dissipation and heat aging, plus a dependability never before realized in any standard duck or glass fabric hot materials belt.

COMPARE THESE ADDITIONAL ADVANTAGES

- All-glass carcass eliminates premature char-out . . . is its own "fire wall".
- Elimination of bulky asbestos and duck plies permits thinner belts for better heat dissipation.
- New high-temperature butyl cover and new all-glass fabric carcass combine to provide a perfectly balanced belt of unexcelled heat resistance.
- Belt can be engineered to specific conditions of heat, abrasion, and operating tensions.
- Lower cost per ton because of competitive price and longer belt life.

• • •

Available at the 28 "U.S." District Sales Offices, at selected "U.S." distributors, or write us at Rockefeller Center, N. Y. 20, N. Y. In Canada, Dominion Rubber Co., Ltd.

Mechanical Goods Division

United States Rubber

Men of Industry

LESTER W. KRUM
. . . joins Strong Steel Fdy.

E. C. FALES
. . . Gunite Foundries pres.

WILLIAM C. ROWLAND
. . . becomes foundry supt.

RALPH K. LORTON
. . . Centrifugal Foundry mgr.

LESTER W. KRUM, since 1945 superintendent of steel foundries, United States Steel Corp., Johnstown, Pa., has joined Strong Steel Foundry Co., Buffalo, as plant manager, in charge of all foundry operations. A graduate of Pennsylvania State University in metallurgical engineering, Mr. Krum joined U.S. Steel's subsidiary, Illinois Steel Co., in 1934 and held several positions in the primary and finishing mills, metallurgical laboratories and process control. In 1941 he was transferred to the Johnstown plant as assistant to the superintendent of steel foundries in charge of melting. Mr. Krum is a specialist in the design and casting of medium and large steel castings.

George F. Hodgson, since 1952 chief engineer at the Batavia, N. Y., plant, Doehler-Jarvis Division, National Lead Co., New York, was named assistant chief engineer of the division at Toledo, O. He joined the division's Batavia plant in 1931 and in 1935 was transferred to the metallurgical laboratory in Toledo. A year later he became Batavia plant metallurgist.

James W. Wolfe has retired as executive secretary of the Non-Ferrous Founders' Society. He joined the society staff as field representative following long experience in the foundry industry in both production and cost work, and served as executive secretary during the last ten years.

● **E. C. Fales** was named president-general manager, Gunite Foundries Corp., Rockford, Ill. Formerly executive vice president, Mr. Fales has headed recent expansion of the company in the automotive and commercial castings fields. **Duncan P. Forbes,** immediate past president, has become chairman of the board, succeeding **John A. Forbes,** who has retired. Pioneers in production of malleable iron, the Forbes family established the forerunner of the present company in 1854. Duncan Forbes served as president of the American Foundrymen's Society in 1942-43.

● **William C. Rowland,** since 1952 assistant foundry superintendent, Alten Foundry & Machine Works Inc., Lancaster, O., was appointed foundry superintendent, succeeding **Val Young,** who retired after 5 years in the position. Mr. Rowland joined the company's foundry department in 1941, and previously served as coreroom foreman and time study analyst.

Arthur P. Guidi was appointed sales manager, Texas Foundries Inc., Lufkin, Tex., to succeed **James R. Hewitt,** who has resigned for health reasons. Mr. Guidi joined the company in 1955 and became steel foundry superintendent last year. Mr. Hewitt became assistant to the president of Texas Foundries two years ago.

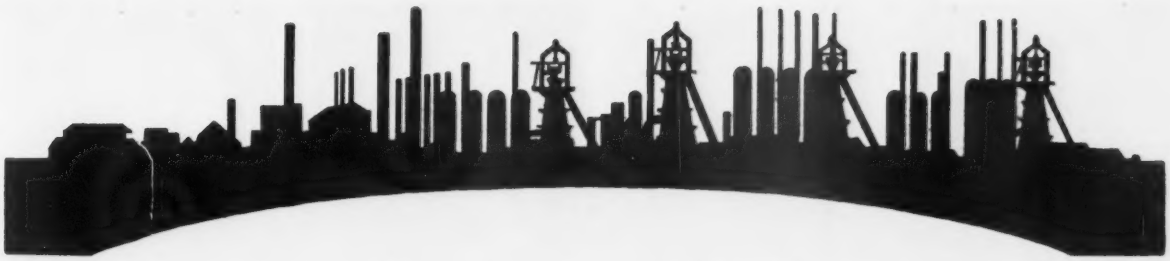
Mrs. J. Arthur Warner was elected vice president, chairman of the finance committee and a director, Detroit Gray Iron Foundry Co., Detroit.

● **Ralph K. Lorton,** since 1949 production superintendent of Perfect Circle Corp.'s sleeve casting plant, Richmond, Ind., was named plant manager of its subsidiary, Centrifugal Foundry Co., Muskegon, Mich. He replaces **Clayton W. Anderson,** resigned. Mr. Lorton joined the company in 1932 as a molder and succeeded to supervisory positions in the foundry.

J. W. Clarke was named manager of product engineering at the Erie, Pa., foundry, General Electric Co. He has been engaged in foundry work since he joined the company in 1925. In 1947 he was chairman of Northwestern Pennsylvania Chapter of AFS. Other managers of product engineering appointed at GE foundries include: **A. B. Steck,** Everett-Lynn Foundries, Everett, Mass.; **R. D. Ahles,** Schenectady; and **J. T. Coggin,** Elmira, N. Y. Mr. Steck has been with GE since 1950. Mr. Ahles was metallurgist for the Schenectady steel foundry since 1954. Mr. Coggin was metallurgist for the Elmira foundry since 1949.

Fred Head has resigned as administrative assistant of the Malleable Founders' Society to join the Automation Development Corp., Willoughby, O.

Robert Newtson, for the past two years, divisional auditor, Central Foundry Division, General Motors Corp., with headquarters in Saginaw, Mich., was named production man-



Always a *MUST* *at WOODWARD* *Uniform* *Quality Pig Iron*

At all times–under all conditions–Woodward has consistently maintained the uniform character and quality of its merchant iron. That's why Woodward iron commands universal confidence throughout the nation's foundry trade.

Sales Department, Woodward, Ala.
Phone Bessemer, Ala. 5-2491
Sales Agents for territory North of Ohio River:
HICKMAN, WILLIAMS & COMPANY with Sales Branches at—

609 Bona Allen Building, Atlanta 3, Ga.; 230 North Michigan Avenue, Chicago 1, Ill.; First National Building, P. O. Box 538, Cincinnati 1, Ohio; 1659 Union Commerce Building, Cleveland 14, Ohio; 1203 Ford Building, Detroit 26, Mich.; P. O. Box 335, Duluth 1, Minn.; 412 Guaranty Building, Indianapolis 4, Ind.; 70 Pine Street, New York 5, N. Y.; 1500 Walnut Street Building, Philadelphia 2, Pa.; 1910 Clark Building, Pittsburgh 22, Pa.; 902 Syndicate Trust Bldg., St. Louis 1, Mo.

Woodward Iron Company

WOODWARD, ALABAMA

Independent Since 1882

JOHN C. PANGBORN
. . . vice chairman

VICTOR F. STINE
. . . Pangborn Corp. pres.

THOMAS W. PANGBORN
. . . board chairman

W. O. VEDDER
. . . Pangborn v. p.

ager of the division's Danville, Ill., plant. Other changes at Danville include: **Thomas E. Smith III,** since 1955 factory manager, is now superintendent; **Arthur P. Siewert,** has become production control superintendent; **James R. Hayden** has succeeded Mr. Siewert as gray iron foundry superintendent, after serving as superintendent of process engineering for the past year.

● **Victor F. Stine** was elected president, Pangborn Corp., Hagerstown, Md. **Ralph M. Trent** was named a director and executive vice president, and **W. O. Vedder,** a vice president. **Thomas W. Pangborn,** founder and president since 1904, will continue to serve as chairman of the board of directors, and **John C. Pangborn,** former first vice president, has become vice chairman of the board. With the company 45 years, Mr. Stine progressed through various activities, became second vice president-sales manager in 1935, vice president-sales and engineering in 1941, and has been a director since 1951. Mr. Trent joined Pangborn 27 years ago, served as district sales manager in Pittsburgh, and since 1947 was manager of the company's Pacific Coast field organization. Mr. Vedder, who has spent 28 years with Pangborn, continues in charge of the expanding dust control division.

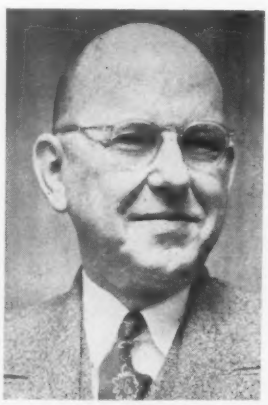
G. C. (Jack) Cole was appointed vice president-general manager, Wysong & Miles Foundry Inc., Greensboro, N. C. Mr. Cole joined the company in 1951 as foundry manager and a director and became a vice president in 1955.

● **Frank M. Robbins,** recently resigned as president, Ross-Meehan Foundries Inc., Chattanooga, Tenn., continues as executive consultant and a director. **Jack C. Lucas** has succeeded Mr. Robbins as president. Mr. Robbins, a graduate of Denison University and the Colorado School of Mines, joined the company in 1918, served as general manager, vice president, and became president in 1933. Active in foundry technical organizations, he was president of Steel Founders' Society of America in 1939-40. Mr. Lucas was associated with Bucyrus-Erie Co., Erie, Pa., until 1944 when he became a consulting engineer for Meehanite Metal Corp., New Rochelle, N. Y. He was named executive vice president of Ross-Meehan last year.

F. L. Griffith and **F. W. Blanchard** were elected vice presidents, Hewitt-Robins Inc., Stamford, Conn. Since 1953 Mr. Griffith has been general sales manager of the industrial products divisions and will continue in that capacity. Mr. Blanchard will be responsible for manufacturing and engineering in the industrial products divisions. Recently he was assistant to the executive vice president.

● **Wayne Belden** has retired as president, Ajax Flexible Coupling Co., Westfield, N. Y. He will continue as marketing and public relations counsel as well as a director. Mr. Belden became executive vice president in

RALPH M. TRENT
. . . becomes exec. v. p.

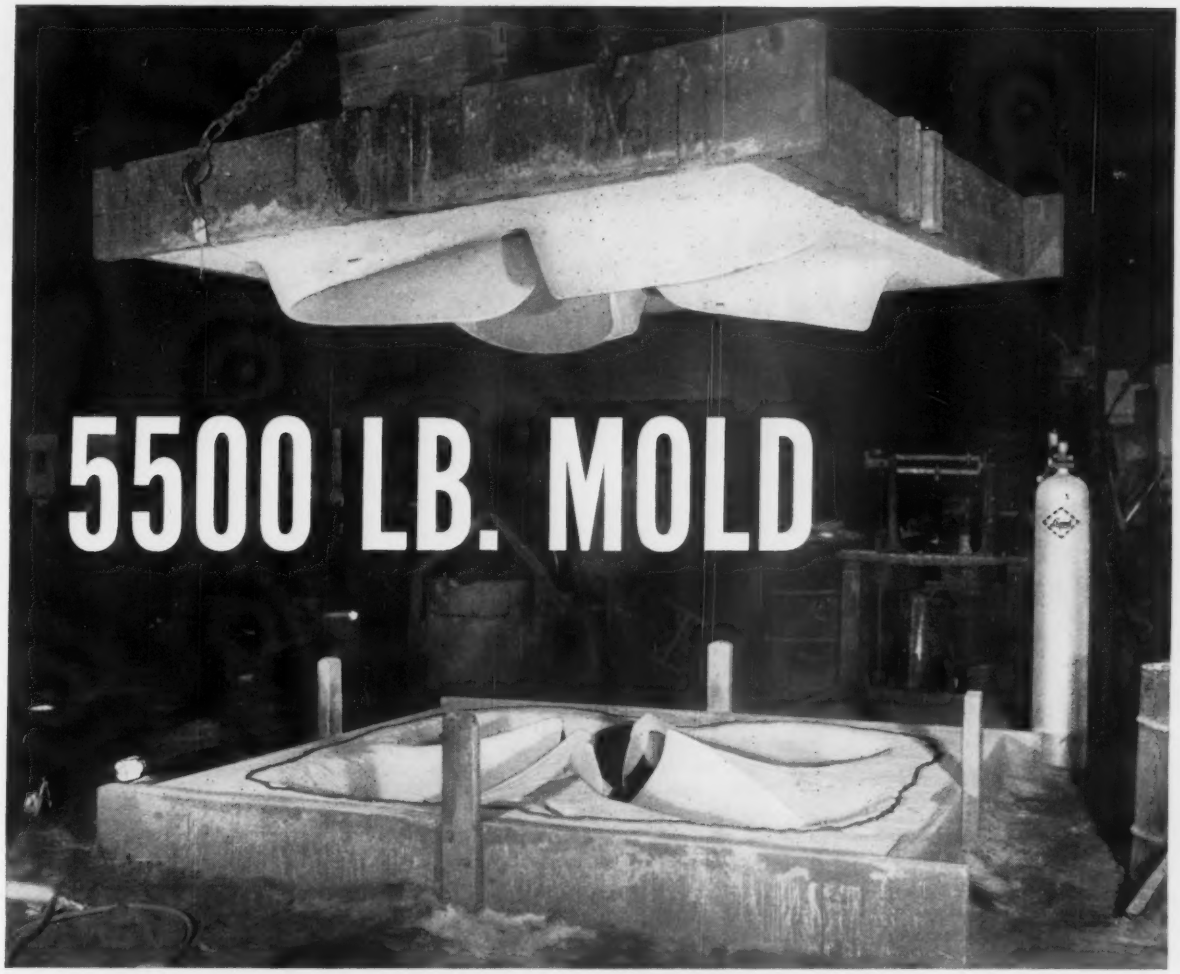


FRANK M. ROBBINS
. . . resigns as president

JACK C. LUCAS
. . . Ross-Meehan pres.

WAYNE BELDEN
. . . reaches retirement

CO_2 CURES



IN 40 MINUTES!

Fast, bakeless hardening of molds for large castings—like this one for 3400 pound nickel aluminum bronze propellers—is standard procedure at Columbian Bronze Corporation, Brooklyn, New York.

In addition to tremendous savings in time, Columbian Bronze reports these added advantages from CO_2 curing. no baking required • far fewer gaggers needed • elimination of need for extreme skill necessary in green sand molding • no danger of drops, soft spots or wet spots in mold • molds may be left for several days before pouring.

For complete facts and technical data on how CO_2 mold curing will revolutionize your operation, contact

World's Largest Producer of

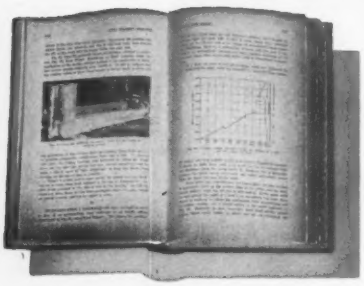
THE LIQUID CARBONIC CORPORATION

3150 South Kedzie Avenue • Chicago 23, Illinois

NEW — Just Published!

STEEL FOUNDRY PRACTICE

By JOHN HOWE HALL



496 pages
252 charts and illustrations
6″ x 9″ cloth bound
Price $12.00

Just published—***Steel Foundry Practice***—a new comprehensive sourcebook covering all phases of modern steel foundry practice. This book is the only up-to-date treatment of the subject available today.

Steel Foundry Practice contains practical information on almost every production problem steel foundrymen encounter. The easy-to-read text is accompanied by over 250 detailed charts, drawings and illustrations of the "how-to-do-it" type.

This volume represents the last of the many contributions which the late John Howe Hall made to the progress of the foundry industry. Material presented in this book began as a series of articles in FOUNDRY magazine.

Steel foundry personnel (from top executives to apprentices), educational institutions, technical libraries, suppliers to the steel foundry industry . . . all will benefit from the use of this book.

A complete cross index permits ready reference to any section. Many references relating to additional sources of information are provided. Use the coupon at the bottom of this page to order your copies now.

ABOUT THE AUTHOR

The late John Howe Hall was associated with the production of steel castings for nearly 50 years. Mr. Hall received his bachelor's and master's degrees from Harvard University. He was employed by Bethlehem Steel Co. and Buffalo Crucible Castings Co. until 1906, when he joined Taylor-Wharton Iron & Steel Co. He remained there until 1937, when he became a consulting metallurgist. His previous major work was The Steel Foundry, *published in 1914, with a second edition in 1922.*

Mr. Hall was the author of many papers presented before the American Society for Testing Materials, the American Foundrymen's Society, the American Institute of Mining and Metallurgical Engineers and the American Society of Mechanical Engineers. In 1924, he received the first Whiting Medal awarded by the ASS.

10 DAY FREE TRIAL

THE PENTON PUBLISHING COMPANY, Book Department
1213 West Third St., Cleveland 13, Ohio

Send me "Steel Foundry Practice" by John Howe Hall

☐ On ten days trial for free examination. If the book meets with my approval I will pay $12 (plus tax if any). Otherwise, I will return the book in good condition, postpaid.

☐ Bill me

☐ Bill my company

☐ Remittance enclosed* in which case the book will be sent postpaid.

Signed _____ Title _____

Company _____

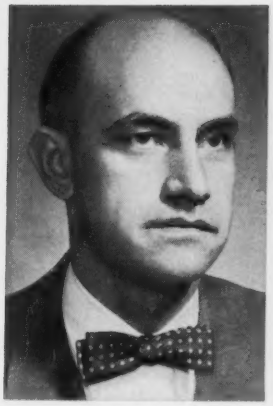
Address _____

City _____ Zone _____ State _____

*Please add 3% to cover state sales tax on orders for delivery in Ohio.

TABLE OF CONTENTS

1. Core and Molding Sands
2. Patterns and Molding Methods
3. Gates and Heads
4. Machine Molding
5. Flasks and Rigging
6. Centrifugal Casting
7. Shakeout, Cleaning and Welding
8. Heat Treatment
9. Cast-Weld Construction
10. Open-Hearth Steelmaking
11. Electric Melting Furnaces
12. Converter Process
13. Pouring Practice



JOSEPH H. CADIEUX
. . . Misco mfg. v. p.

FREEMAN M. JONES
. . . administrative v. p.

KENNETH J. YONKER
. . . sales v. p., Miisco

H. H. BLOSJO
. . . foundry process engineer

1951 and president in 1955. **Harley E. Northrop** former treasurer, has succeeded Mr. Belden as president. Other officers of the company are: **Charles W. Belden,** vice president; **Robert G. Cady,** treasurer; and **Thomas H. Brumagin,** secretary.

● **Joseph H. Cadieux** was named vice president-manufacturing, **Freeman M. Jones,** administrative vice president, and **Kenneth J. Yonker,** vice president-sales, Misco Precision Casting Co., Muskegon, Mich. Mr. Cadieux, formerly manager of the Detroit plant, joined Misco in 1954. Mr. Jones, with the company since 1953, was previously administrative manager. Mr. Yonker, who has been sales manager, became associated with Misco in 1954.

Thornton F. Holder was named director of research, Diamond Alkali Co., Cleveland, succeeding **Dr. Albert W. Meyer,** who has resigned as director of exploratory research. Mr. Holder will continue as research co-ordinator and patent counsel for the company.

Frank Anderson retired recently from Atlas Brass Foundry, Los Angeles, after 34 years as president-general manager. **M. M. Anderson** succeeds him as president. **R. F. Truer** was named vice president-general manager.

James G. Henzel Jr. was appointed applied research engineer at the General Electric Co.'s foundry department applied research and development laboratory, Schenectady. He joined the company last year.

M. R. McLaughlin was recently appointed sales manager, M. Greenberg's Sons Brass Foundry & Machine Works, San Francisco.

R. F. Teeling was named one of four regional managers recently by Manhattan Rubber & Packing Division, Raybestos-Manhattan Inc., Passaic, N. J. Mr. Teeling is eastern regional manager, with **Stewart Monroe, J. T. M. Frey,** and **F. McBrearity,** district managers in New York, New Jersey and Philadelphia, respectively. **A. L. Hawk** was named central regional manager, with **A. N. Johnston Jr., G. S. Himebaugh,** and **E. T. Fair,** district managers in Pittsburgh, Chicago and Denver. **C. P. Shook Jr.,** southern regional manager, is assisted by **A. A. Ringland, A. E. Jackson, E. W. Nagel,** and **R. C. Nielson,** district managers in Birmingham, New Orleans, Dallas and Houston, Tex. **S. V. V. Hoffman,** western regional manager, is assisted by **R. B. Park** as San Francisco district manager.

Semon Stupakoff, president, Stupakoff Ceramic & Mfg. Co., Latrobe, Pa., division of the Carborundum Co., Niagara Falls, N. Y., has been made vice president of Carborundum. **Robert Barr,** sales manager, Refractories Division of Carborundum, Perth Amboy, N. J., becomes general manager of the Stupakoff Division to succeed Mr. Stupakoff. Replacing Mr. Barr as division sales manager is **Arthur A. Turner,** manager of product engineering, who has been succeeded in the latter capacity by **Otto R. Stach,** with **Charles F. Geiger** as assistant manager.

Delos Sabin was appointed buyer of castings and powdered metal parts, and **John Toth,** buyer of plastic molded parts, Leece-Neville Co., Cleveland. Mr. Sabin until recently was associated with Cleveland Diesel Division, General Motors Corp., Cleveland. Mr. Toth has been with the light metals division, Thompson Products Co., Cleveland, for 4 years.

● **H. H. Blosjo** recently joined Malleable Iron Fittings Co., Branford, Conn., as steel foundry process engineer. A graduate of University of Minnesota, for 2 years he was associated with Minneapolis Moline Co., Minneapolis, as chief chemist, and since 1930 was chief metallurgist, Minneapolis Electric Steel Castings Co., there. Mr. Blosjo was chairman of the Twin City Chapter of the AFS in 1955-56.

Dr. R. B. Ellestad was one of four new vice presidents recently named by Lithium Corp. of America, Minneapolis. Director of research since 1942, Dr. Ellestad continues in that position. **Walter M. Fenton,** from 1943-1955 sales manager, is now vice president in charge of product research and development. **J. Dean Herman** is vice president and director of chemical plant operations, and **J. Douglas Campbell,** vice president-director of sales. **Willis W. Osborne,** treasurer, and **Fremont F. Clarke,** general manager of operations, former vice presidents of Lithium Corp., were appointed senior vice presidents.

A. F. Anzlovar, formerly vice president-sales, was appointed vice president-assistant general manager, Mercast Mfg. Corp., La Verne, Calif., affiliate of Atlas Corp., New York. He was previously assistant to the president, Kolcast Industries, Cleveland, and assisted in the organization of Industrial Metal Castings Co., there, which later became Mercast Mfg. Corp.

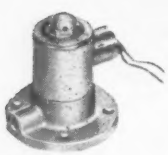
Fred Bonacker, sales manager and assistant vice president, Bonded Abrasives Division, Carborundum Co., has retired after 45 years of service. He has been succeeded as sales manager by **Fred W. Scott,** and **Henry**

new

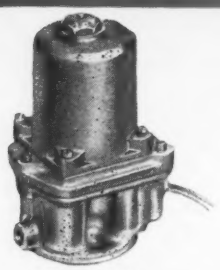
Ross air control

feature

long



WHITE STAR
SPOOL SOLENOID



GOLD STAR
OIL-IMMERSED SOLENOID

BLUE STAR MV

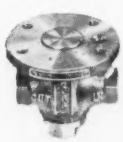
BLUE STAR TD

BLUE STAR WV

feature

match any head

STRAIGHTWAY
NORMALLY
CLOSED



STRAIGHTWAY
NORMALLY
OPEN

Tests indicate a trouble-free life of over 25 million cycles for valves with the spool solenoid pilot section, and *more than 40 million for all other Starline* valves shown. Heads and bodies are completely and instantly interchangeable. Sizes from ¼″ to 1¼″. Even *more* Starline models coming later. Write for Starline data file.

Ross

feature

Starline

new

valve series

life

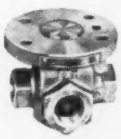
feature

to any valve body!

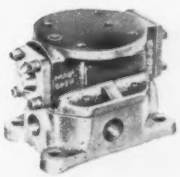
feature

3 WAY NORMALLY OPEN

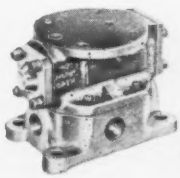
3 WAY NORMALLY CLOSED



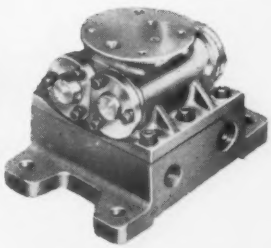
3 WAY NORMALLY OPEN



3 WAY NORMALLY CLOSED



4 WAY



A Galaxy of New Air-Control Stars Are Coming Your Way From

OPERATING VALVE COMPANY

107 EAST GOLDEN GATE AVENUE • DETROIT 3, MICHIGAN

feature

Circle 635 on Inquiry Card—Page 209

JOHN W. PORTER
. . . retires from ASF

ROBERT B. COTTRELL
. . . ASF engineer retires

B. D. THOMAS
. . . Battelle director

A. F. SWARD
. . . Bakelite dept. mgr.

J. Jeffers has been named to the newly created position of assistant sales manager. Other appointments include **W. D. Dickerson** as acting field sales manager at Detroit and **W. H. Crocker** as division field sales manager in the Southwest with headquarters at St. Louis.

● **John W. Porter,** assistant vice president, American Steel Foundries, Chicago, retired recently after more than 41 years of service. A graduate of University of Kentucky, he served at company plants in East St. Louis, Ill., Chester, Pa., Granite City, Ill., and East Chicago, Ind., and recently at the manufacturing research laboratory in East Chicago. Other veteran employees retiring from the company are **Robert B. Cottrell** and **Chester H. J. Walcher,** with 42 and 48 years of service, respectively. Mr. Cottrell, also a University of Kentucky graduate, served consecutively as engineer of tests, assistant chief mechanical engineer and, since 1942, as chief mechanical engineer. Mr. Walcher, since 1941, manager of the Granite City works, came up through production ranks there and at East St. Louis.

● **Max C. Farmer** was named technical director, Beryllium Corp., Reading, Pa. A graduate of Michigan College of Mining and Technology, in 1945 he left the company as general superintendent, to become director of the Engineering Division of the Allied Commission in Rome. In 1947 he became assistant chief of the engineering division, Aluminum Co. of America, Pittsburgh, and recently was staff metallurgist on the Materials Advisory Board of the National Academy of Sciences, Washington.

● **Joseph N. Leaverton** was named superintendent of foundries, Hamilton Foundry & Machine Co., Hamilton, O. A graduate of Ohio State University, he joined the company in 1948 and previously served as foundry foreman, general foundry foreman, production engineer and chief industrial engineer.

● **B. D. Thomas** was appointed director of Battelle Memorial Institute, Columbus, O., succeeding **Dr. Clyde Williams,** who has held the position since 1934. Dr. Williams will continue as president of the institute. Dr. Thomas joined Battelle's executive and technical staff in 1934, became assistant director in 1942, and vice president in 1955.

● **A. F. Sward** was named sales manager, bonding materials department of the plastics division, Bakelite Co., division of Union Carbide & Carbon Corp., New York. His work will include sales of plastics for foundry uses.

● **John W. Little** was elected president, Goslin-Birmingham Mfg. Co., Birmingham, to succeed **Joseph T. Hartson,** retired. Mr. Little was also named a director.

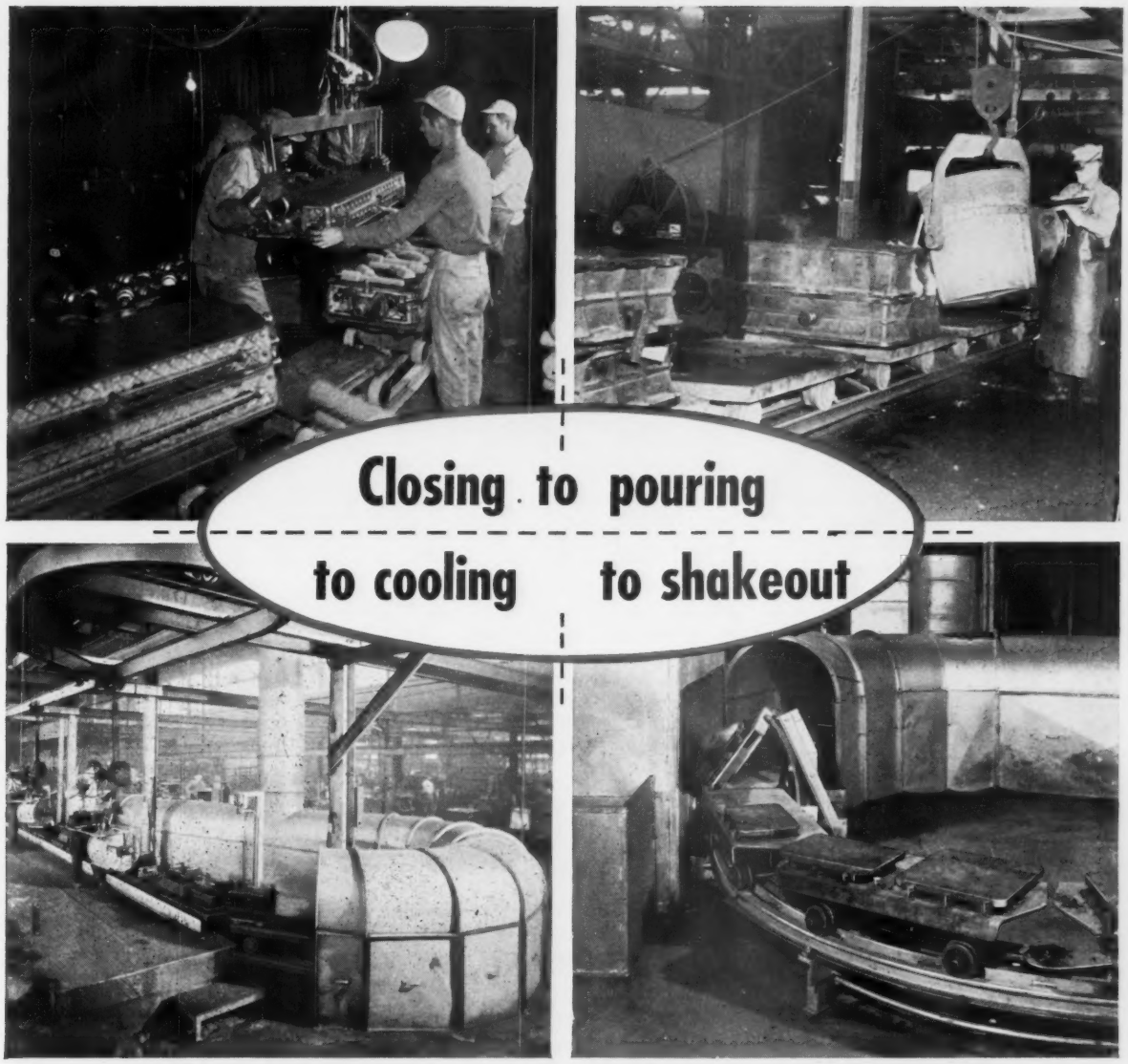
● **H. D. Bryk** was named manager of operations, Alloy Precision Castings Co., Cleveland. Since graduating from Columbia University in

MAX C. FARMER
. . . technical director

JOSEPH N. LEAVERTON
. . . Hamilton foundries supt.

JOHN W. LITTLE
. . . heads Goslin-Birmingham

H. D. BRYK
. . . becomes operations mgr.



NON-STOP

with the efficiency and economies of a LINK-BELT Tru-Trac Mold Conveyor

IF pouring in your foundry is continuous, no other mold handling method can match the economies Link-Belt Tru-Trac offers you. It simplifies the mold handling operation by eliminating unnecessary steps in transferring the molds from molding machines to conveyor. Pouring and shakeout are centralized for greater efficiency. And all along the line, Tru-Trac conserves floor space . . . permits straight-line movement of molds through molding, closing, pouring, cooling and shakeout operations. Working conditions, too, are improved by cooling hoods that confine smoke and gases.

As part of its complete line of foundry equipment, Link-Belt makes conveyors for handling molds ranging in size from automotive engine valve lifters to bath tubs. For expert engineering in foundry mechanization, call your nearest Link-Belt office. Or you can get full information by writing directly for Book 2423.

LINK-BELT

CONVEYORS AND PREPARATION MACHINERY

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

14,296

MEN OF INDUSTRY

LESTER C. SMITH
. . . Spencer Turbine pres.

R. A. BRACKETT
. . . executive v. p.

DR. WILLIAM ROSTOKER
. . . assistant dept. mgr.

ROBERT E. WARD
. . . joins N. Y. Air Brake

1941, he has spent most of his career in the investment casting industry. For over 5 years he was a division manager for Arwood Precision Casting Corp., Brooklyn, N. Y. Mr. Bryk joined Alloy Precision Castings Co. last year as an assistant to the executive vice president-general manager, Frank W. Glaser.

● **Lester C. Smith** was appointed president and **R. A. Brackett,** executive vice president, Spencer Turbine Co., Hartford, Conn., following the retirement of **H. H. Richardson,** who was with the company 47 years and president since 1930. Mr. Smith, joined the company in 1925 and was chief engineer and more recently a vice president. Mr. Brackett became a sales engineer for the company in 1929, was made sales manager in 1932 and a vice president in 1944. Other executive advancements include: **Allen N. Dryhurst,** secretary; **Frank N. Cooke,** treasurer, and **Frederick E. Atchison,** assistant treasurer.

Robert G. Broberg was named sales manager for the air and hydraulic power cylinder division, Hannifin Corp., Des Plaines, Ill. Other recent appointments as divisional sales managers include: **William C. Thompson,** air valve division; **Arnold W. Blackshaw,** machinery division; and **H. J. Andresen,** Crown products division including air line filters, regulators and lubricators.

Edward G. Belden was appointed sales engineer, Robert H. Newton Co., Cleveland, representative for producers of steel castings, forgings, bearings, plate fabrication and special fasteners and springs. Mr. Belden was formerly with Standard Oil Co. of Ohio in its manufacturing and marketing departments.

● **Dr. William Rostoker** was named assistant manager of the metals research department, Armour Research Foundation, Illinois Institute of Technology, Chicago, in charge of applied and physical metallurgy, foundry and steelmaking, and welding sections. A graduate of University of Toronto, he received his doctorate from Lehigh University. Dr. Rostoker joined the foundation in 1951, and until recently was senior metallurgist and supervisor of physical metallurgy.

A. A. Boehm was named general manager of phenolics, Bakelite Co., division of Union Carbide & Carbon Corp., New York. With the company since 1935, recently he was production superintendent at Bakelite's Bound Brook, N. Y., plant. **Dr. A. W. Downes,** formerly associate director of development for Bakelite Co., was named general manager of new resins and compounds. He joined Union Carbide in 1933.

Gordon C. Curry was named general sales manager, Precision Castings Co., division of Harsco Corp., Fayetteville, N. Y. He joined the company in 1946 at the Kalamazoo, Mich., plant and became eastern sales manager in 1949. **Boyden W. Hindman** was appointed manager, and **J. Paul Evans,** assistant manager, of the new home office sales department in Fayetteville.

Roy F. Nosek, for the last 2 years sales engineer in Michigan, Ohio, Indiana and the southern states for Beardsley & Piper Division of Pettibone Mulliken Corp., Chicago, has been appointed sales manager, to supervise foundry machinery sales activities. He has been with the company 20 years.

● **Robert E. Ward** was appointed director of manufacturing, New York Air Brake Co., New York. For many years Mr. Ward was with Eclipse-Pioneer Division, Bendix Aviation Corp., Teterboro, N. J., as director of metallurgy, foundry manager, and manager of special services.

Clyde R. St. John, since 1955 mill products manager at the Trentwood, Wash., plant, Kaiser Aluminum & Chemical Corp., Oakland, Calif., was appointed general staff metallurgist for the company. He joined the Trentwood plant in 1946, later transferring to the Newark, O., plant, where he became superintendent.

Elmer E. Burk was named manager, Acme Steel & Malleable Iron Works, Buffalo, division of Buffalo Brake Beam Co., New York. For the past two years he was sales manager, Crucible Steel Casting Co., Cleveland, and previously was president, Lancaster Malleable Castings Corp., Lancaster, N. Y.

R. K. Yancey was appointed sales representative in charge of the West Coast office recently opened in Riverside, Calif., by the J. B. Ehrsam & Sons Mfg. Co., Enterprise, Kans. Mr. Yancey was engaged in engineering and sales work since he joined the company in 1945.

Jules J. Henry has been appointed director of quality control, Lavelle Foundries, Anderson, Ind. A graduate of Case Institute of Technology, Mr. Henry was formerly with Forest City Foundries Co., Cleveland.

George T. Fox was recently appointed president and executive officer, Reynolds Mfg. Co., Springfield, Mo.

American Well Works, Inc., Aurora, Illinois

"IF IT'S NOT PERFECT, IT MUST BE THROWN OUT!"

Why American Well Works uses Cities Service Delco Core Oil

Mister, you're looking at one of the most complicated cores made—and at American Well Works, it must be perfect or get thrown out.

American has an 86-year reputation to maintain—a reputation for custom-engineered deep well turbine pumps and other equipment for handling water and waste.

For this reason, American carries the making of parts from raw material to finished product. Naturally, that means its own foundries . . . one for iron, another for brass. In each case, however, the brand of core oil is always the same—Cities Service Delco Core Oil.

At the iron foundry, Delco #936 has won high praise for its adaptability to all sized cores, without alteration of the mixture. "It's uniform from batch to batch, has reduced blows to a minimum, and allows us to use one quart of oil for every three required by our previous brand," reports American.

The story is similar in the brass works where Delco #54 is used to make intricate cores for pump castings. "Core and core oil must be perfect," says American, "and we're happy to say they almost always are."

To find out more about Delco Core Oils and results of firms such as American, talk with a Cities Service Representative. Or write: Cities Service Oil Company, 20 North Wacker Drive, Chicago 6, Illinois.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Pouring A Casting, American's employees put the core and its core oil to the acid test. Thanks to Cities Service Delco Core Oils, blows have been reduced to a minimum in both the brass and iron foundries.

Many Sized Cores are produced by American Well Works' iron foundry—yet one oil, Cities Service Delco #936, is suited to them all, without alteration of mixture. They now use only 1 qt. of Delco #936 for every 3 required by their previous oil.

Conveyor Speeds Inspection at New Permanent Mold Foundry

By JAMES JOSEPH

THE Gaines Co., at its new Los Angeles plant, has compacted within 5000 sq ft what probably is one of the most diversified and efficient of aluminum permanent mold foundries. Production consists primarily of aircraft castings.

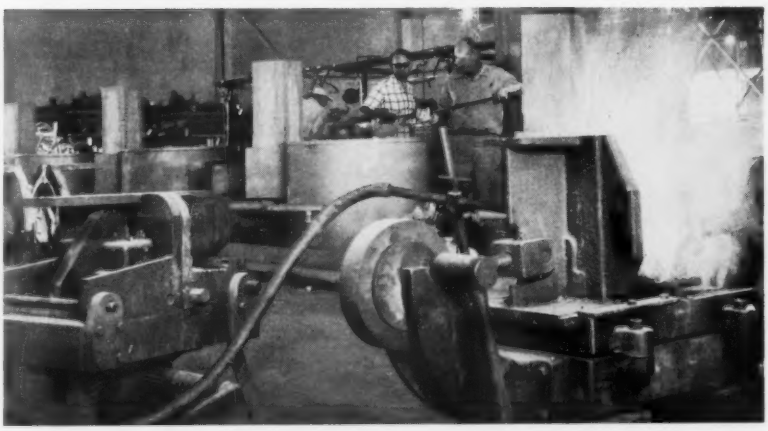
Eight gas-fired furnaces supply molten metal to 32 permanent molds. Output of the molds is routed along a single, continuous, overhead conveyor. A theory the company has put into practice is that, ideally, inspection should be at a molder's elbow. Since this arrangement is impractical in a high-production foundry like Gaines', the conveyor has been substituted to provide nearly comparable conditions. Traveling 15 to 30 ft per minute, it insures inspection within a maximum of six minutes after casting.

"Advantages," says President Frank Gaines, "are many. Mistakes are caught almost immediately. Production is maintained at a peak, and scrap is reduced. In some foundries where inspection lags hours, even an entire shift behind casting, scrap loss looms high. And this, of course, reduces marketable output."

The operational setup gives the foundry tight control over scrap at its source. Every casting goes the conveyor route and, at day's end, every pound and piece of scrap is counted—debited against the production floor. Result: A highly accurate, realistic appraisal of both scrap and production.

Melting—Mid-center of the 5000-sq-ft casting floor, and aligned down it, are the eight furnaces, ingot-charged by two men assigned as tenders. Each furnace has a capacity of about 550 lb and melts some 2500 lb during a typical 8-hour pouring shift.

Each furnace, in turn, serves four molding stations (two on each side of the furnace). The molds are ladle-poured, two molders sharing a ladle.



Eight gas-fired ovens can melt 2500 lb of aluminum in 8-hour shift

As many as 32 different molds, and thus that many different products, may be working simultaneously. Depending on complexity of the molds, production has been running 250-500 castings a shift per mold. The finished castings average slightly less than 1 lb in weight.

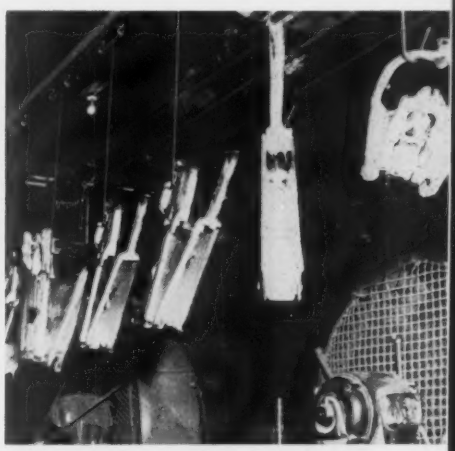
The Conveyor—Although the conveyor does not increase production, it does reduce scrap. Just as importantly, it provides a receiver for every casting generated. Dispensed with are the usual barrels—which too often are lost or shunted aside, particularly on such high-output foundry floors.

Says Frank Gaines: "Too many light metal foundries, simultaneously pouring a score of products, barrel their production. Barrels often are lost in the rush. Besides, barreling defeats most attempts at an accurate scrap count. Casting errors elude detection too, for it's only natural that harried inspectors pick and sample from a barrel's top—overlooking errors which may scrap castings which came earlier from the mold."

Castings come from their molds at about 600° F and have cooled to perhaps 400° by the time they reach hot inspection. If required—for conveyorization—a loop is thrown into a casting's gate so that the part can be hung from a conveyor hook. The 210-ft conveyor was designed with 250 hooks which, from production studies, proved enough to handle output from 32 molds, without overloading.

The conveyor operates in this fashion: 1. It takes every piece of metal cast including scrap. 2. In less than six minutes it carries castings, via one of the hooks or small conveyorized tote boxes (for small castings), to the hot-inspection station, a maximum of 210 ft down the conveyor. 3. It carries every casting within the inspector's scrutiny. 4. It simplifies inspection. Working asbestos-gloved and using tongs, the inspector makes a quick visual check of castings for such defects as gas holes, shifts, misruns, cracks and dimensional inaccuracies.

A maximum of 32 permanent molds can be operated simultaneously



Overhead conveyor takes castings from molds to inspection station

Inspector checks pieces within 6 minutes after they have been cast

Checking for dimensional accuracy. Most castings are for aircraft use

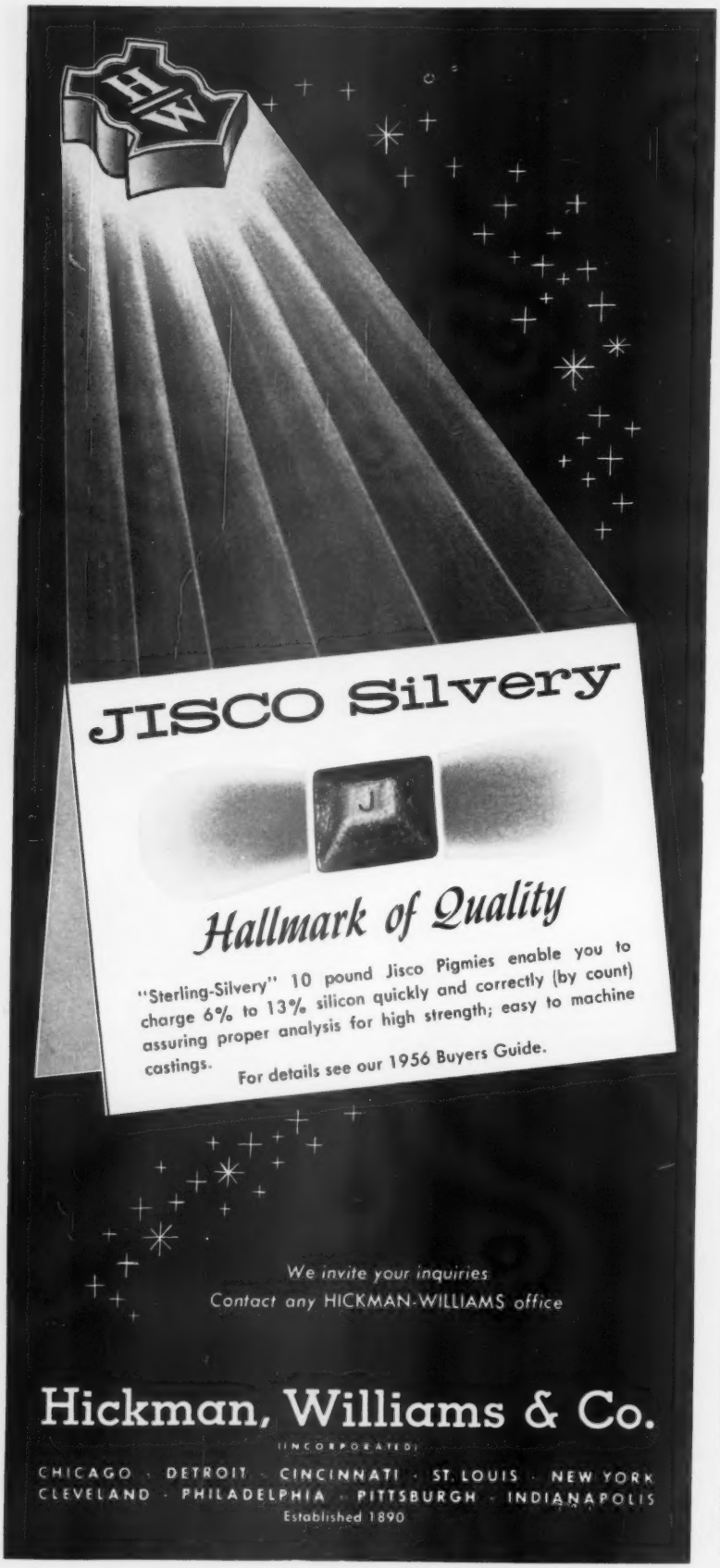
Inspection—Sampling the castings, the inspector spots a defect and immediately warns the molder of the fault. The inspector then takes a double sample from that molder's output. If the defect persists, the mold is shut down, and a standby mold (preheated) is pressed into production. Suspected castings are routed to the x-ray department (some 100 ft from the casting floor). Routinely, castings are sampled (10 per cent of production) and x-rayed every two hours. But defective castings get top priority. They flow directly and immediately to x-ray.

X-Ray—The 170-kv machine, with two shooting stations and standardized to 14 x 17-in. plates, can come up with a diagnosis within 15 minutes. Plates are read wet and later dried and stored. X-ray may confirm that a flaw, originally detected by external defects, actually has its origin deep within the casting.

If x-ray reveals no internal defect, corrective research is assigned to what is called an "experimental molder"—usually the top molder on the casting floor. This man's job is to cast from the suspected mold and probe the trouble from a practical, casting-floor viewpoint. The fault may be the molder's. It may lie with pouring temperatures, with the mold itself or with some fault in the casting procedure. If the molder is at fault (as he often is), the experimental man works with him to correct the error. Meantime, the suspected mold is out of line production, and another, preheated, is assigned temporarily to one of the molders, who then handles two molds until the faulty mold either is back on the line or declared out of production for that shift. Production thus is maintained at scheduled output.

Standing by at a special, gas-fired preheat station are some 5 to 15 molds. These heated molds are moved onto the production floor by fork-lift and often are in production within 2 to 5 minutes after a mold shutdown due to defective castings.

Cleaning — After hot inspection, castings are segregated (by the in-


JISCO Silvery
Hallmark of Quality
"Sterling-Silvery" 10 pound Jisco Pigmies enable you to charge 6% to 13% silicon quickly and correctly (by count) assuring proper analysis for high strength; easy to machine castings.
For details see our 1956 Buyers Guide.
We invite your inquiries
Contact any HICKMAN-WILLIAMS office
Hickman, Williams & Co.
(INCORPORATED)
CHICAGO · DETROIT · CINCINNATI · ST. LOUIS · NEW YORK
CLEVELAND · PHILADELPHIA · PITTSBURGH · INDIANAPOLIS
Established 1890

spector) to one of 32 tote boxes. The day's production usually is diversified enough so that the inspector readily can recognize each different casting and assign it quickly to its proper tote box. The steel tote boxes measure 15 x 18 x 30 in. and feed via a gravity roll conveyor from hot-inspection to degating.

A degating station, where metal band saws are used, can handle production from about 15 molders. From degating, castings flow via tote box on another gravity conveyor to any of four rough-grind and finish-grind stations. Each rough grinder (belt sanders rigged with 220-grit, aluminum oxide belts) can handle output from five or six molders, or upward of 100 castings an hour. Both rough-grind and finish-grind stations employ pedestal grinders, dual-wheeled, with an operator working each wheel. All pedestal units are powered by 5-hp motors. Finish-grinders, working three machines (six stations) can run 75 castings per wheel per hour.

From grinding, castings flow to filing and deburring stations where they are machine and hand filed, a job which at times demands an hour per casting. Fifteen operators work this area. Castings usually arrive at filing-deburring some 24 hours after they have come out of their molds. Here the castings get a second inspection, this time with special attention to saw nicks, grindoffs and excessive filing or deburring.

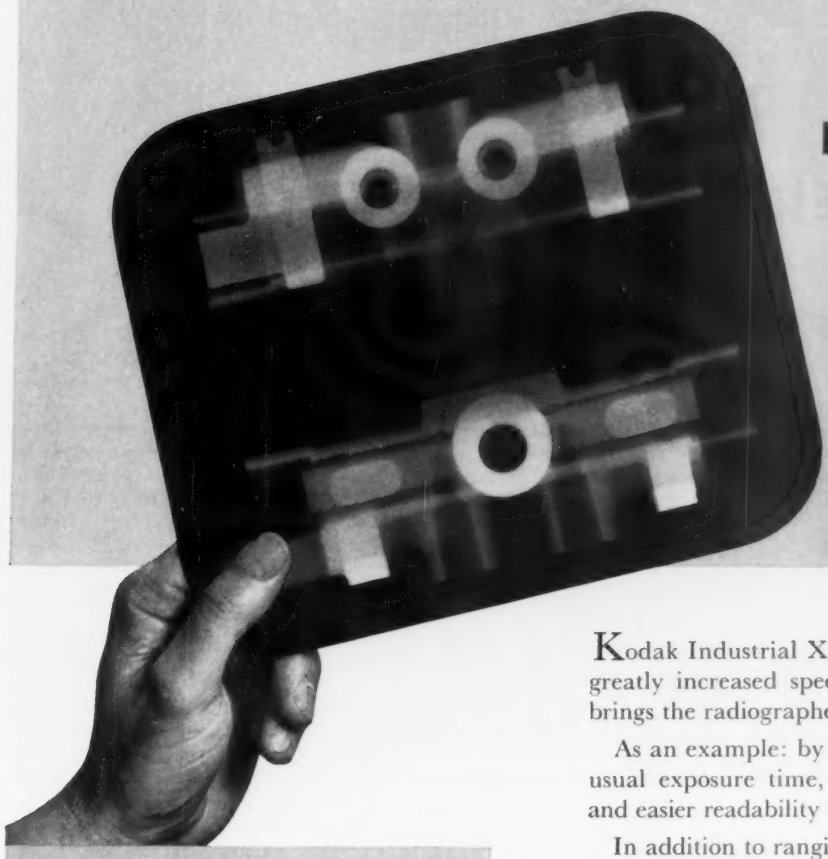
Next the castings are routed to solution heat treating. Furnaces hold castings at 1000° F for 12 to 16 hours and the parts then are quenched. As with most aluminum high-precision castings, fully 40 per cent must be straightened. After straightening, the castings are artificially aged at about 320° F for 2 to 5 hours, then hardness tested.

Book Review

Symposium on Atmospheric Corrosion of Non-Ferrous Metals, cloth, 164 pages, 6 x 9 in., published by the American Society for Testing Materials. 1916 Race St., Philadelphia 3. Price $2.75.

The nine papers in this symposium list all data gleaned from one of the most comprehensive atmospheric corrosion test programs attempted. Materials utilized in the exposure tests included 24 wrought alloys of zinc, nickel, copper, lead, tin and aluminum which were exposed at nine significant localities across the country, and evaluated after periods of 1, 3, 6, 10 and 20 years. Significance of the results obtained in each metals field are discussed in detail in the various papers.

Makes reading easier. . . quicker



KODAK Industrial X-ray Film, Type AA

Kodak Industrial X-ray Film, Type AA, gives you greatly increased speed — a film characteristic that brings the radiographer greatly extended possibilities.

As an example: by using reduced kilovoltage and usual exposure time, greater radiographic contrast and easier readability are obtained.

In addition to ranging up to double the speed, this new film retains the fine sensitivity characteristics which made Kodak Type A the most widely used x-ray film in industry.

Kodak Industrial X-ray Film, Type AA, can save you time and extend the usefulness of your present radiographic equipment. Get all the details. Contact your x-ray dealer or Kodak Technical Representative.

EASTMAN KODAK COMPANY

X-ray Division Rochester 4, N. Y.

- Reduces exposure time—speeds up routine examinations.
- Provides increased radiographic sensitivity through higher densities with established exposure and processing technics.
- Gives greater subject contrast, more detail and easier readability when established exposure times are used with reduced kilovoltage.
- Shortens processing cycle with existing exposure technics.
- Reduces the possibility of pressure desensitization under the usual shop conditions of use.

Kodak

Nominates

OFFICERS and DIRECTORS

NOMINATIONS for officers and directors to be elected at the 1957 annual meeting of the American Foundrymen's Society in Cincinnati have been announced. Business meeting of the 61st Castings Congress is scheduled for Wednesday morning, May 8.

Harry W. Dietert, board chairman, Harry W. Dietert Co., Detroit, and current vice president of the AFS, has been nominated for the presidency in 1957-58.

Lewis H. Durdin, president, Dixie Bronze Co., Birmingham, is the nominee for vice president. Mr. Durdin, now serving his third year as a national director, is a past president of the Non-Ferrous Founders' Society.

Directors nominated to serve three years are:

Henry G. Stenberg, foundry superintendent, Draper Corp., Hopedale, Mass., representing Gray Iron, Brass and Bronze.

A. A. Hochrein, district manager, American Smelting & Refining Co., Baltimore, representing Supplies.

William D. Dunn, assistant to the president, Oberdorfer Foundries Inc., Syracuse, N. Y., representing Brass and Bronze, Aluminum and Magnesium.

Fred J. Pfarr, manager, Lake City Malleable Co., Cleveland, representing Malleable Iron.

Karl L. Landgrebe Jr., general manager, Foundry Division, the Wheland Co., Chattanooga, Tenn., representing Gray Iron.

John R. Russo, president, Russo Foundry Equipment Co., Oakland, Calif., representing Equipment.

Congress Program—The accompanying listing shows the tentative schedule for technical sessions during the week of the Congress. Because of the AFS Engineered Castings Show, which will be held simultaneously, the technical program is being arranged to provide papers of interest to designers and buyers of castings as well as to foundrymen.

The AFS reports that the number of foundries planning to exhibit in the Engineered Castings Show at the Cincinnati Music Hall assures that a representative group of the foundry industry's products will be on display for inspection by designers and users. The show is scheduled to be open from 9 a.m. to 5:30 p.m. on Monday, Tuesday and Thursday; from 11:30 a.m. to 5:30 p.m. on Wednesday, and from 9 a.m. to 5 p.m. on Friday. Technical meetings and registration will be conducted at both the Music Hall and the Netherlands Hilton Hotel.

TENTATIVE SCHEDULE OF TECHNICAL SESSIONS

MONDAY, MAY 6

9 a.m.—Malleable—Pattern—Statistical Quality Control—Steel
12 noon—Steel Roundtable Luncheon
2:30 p.m.—Sand
4 p.m.—Fundamental Papers—Management—Safety, Hygiene & Air Pollution—Sand
8 p.m.—Malleable Shop Course

TUESDAY, MAY 7

9 a.m.—Pattern—Safety, Hygiene & Air Pollution—Statistical Quality Control—Steel
12 noon—Malleable and Pattern Roundtable Luncheons
2:30 p.m.—Fundamental Papers—Light Metals—Malleable—Sand
4 p.m.—Pattern
7 p.m.—Sand Division Dinner
8 p.m.—Sand Shop Course

WEDNESDAY, MAY 8

9 a.m.—Annual Business Meeting and Hoyt Memorial Lecture
12 noon—Management Luncheon
2:30 p.m.—Education—Gray Iron—Light Metals—Sand
7 p.m.—Annual Banquet

THURSDAY, MAY 9

9 a.m.—Gray Iron—Brass & Bronze—Heat Transfer
12 noon—Light Metals Roundtable Luncheon
2:30 p.m. — Sand — Education — Brass & Bronze — Industrial Engineering — Light Metals
8 p.m.—Gray Iron Shop Course—Brass & Bronze Shop Course

FRIDAY, MAY 10

9 a.m.—Gray Iron—Brass & Bronze
12 noon—Gray Iron Roundtable Luncheon
2:30 p.m.—Brass & Bronze—Industrial Engineering — Light Metals — Sand — Gray Iron Shop Course

Titles of a number of papers tentatively scheduled for presentation at Cincinnati which will be of interest to casting buyers have been announced by AFS. They cover a broad range of subjects.

Titanium—In the relatively new field of titanium, discussion will cover the present status of the art, use of graphite molds in production of castings, mechanical properties, and effect of iron additions.

Several papers will be devoted to die castings, including aluminum and magnesium. Discussion of light metals also will treat green sand, shell mold and permanent mold castings, test bar properties, and a roundtable luncheon session on the subject of engineered light metal castings.

Subjects relating to malleable iron include galvanizing embrittlement and a report by the Pearlitic Malleable Committee.

Heat treatment, microstructure and machinability control, and ladle inoculation are among topics planned for discussion by the Gray Iron Division.

The Brass and Bronze Division, at a casting clinic session, will consider casting difficulties caused by poor design. Among other subjects are notch ductility of brass and bronze and the effect of geometry on the properties of certain copper-base alloys.

Steel Division topics include modern welding methods and grain refinement of stainless steel castings.

Plastic Patterns—Plastics as a pattern material will figure prominently in sessions to be sponsored by the Pattern Division.

Influence of vibration on solidifying metals has been selected by the Fundamental Papers Committee as one of its discussion subjects.

The Sand Division will have a di-

Would pitch-impregnated nipples save us money?

Let's call Great Lakes Carbon — they've always been helpful, and they're good people to work with!

ELECTRODE GLC® DIVISION

GREAT LAKES CARBON CORPORATION

18 EAST 48TH STREET, NEW YORK 17, N.Y. · OFFICES IN PRINCIPAL CITIES

versified program. Among the subjects to be considered are measurement of casting surface roughness, influence of sand grain distribution on casting finish, the meaning of mold hardness, effect of materials on green core properties, and use of oil-bonded sand for precision casting.

In addition to the Gray Iron Division's regular technical program, this metal also will be discussed in the Charles Edgar Hoyt Memorial Lecture. The lecture will be presented immediately following the annual business meeting by Hyman Bornstein on "The Past, Present and Future of Iron Castings."

Hotel accommodations at Cincinnati will be handled by a housing bureau there. Room application forms recently were mailed by the AFS to society members.

Book Review

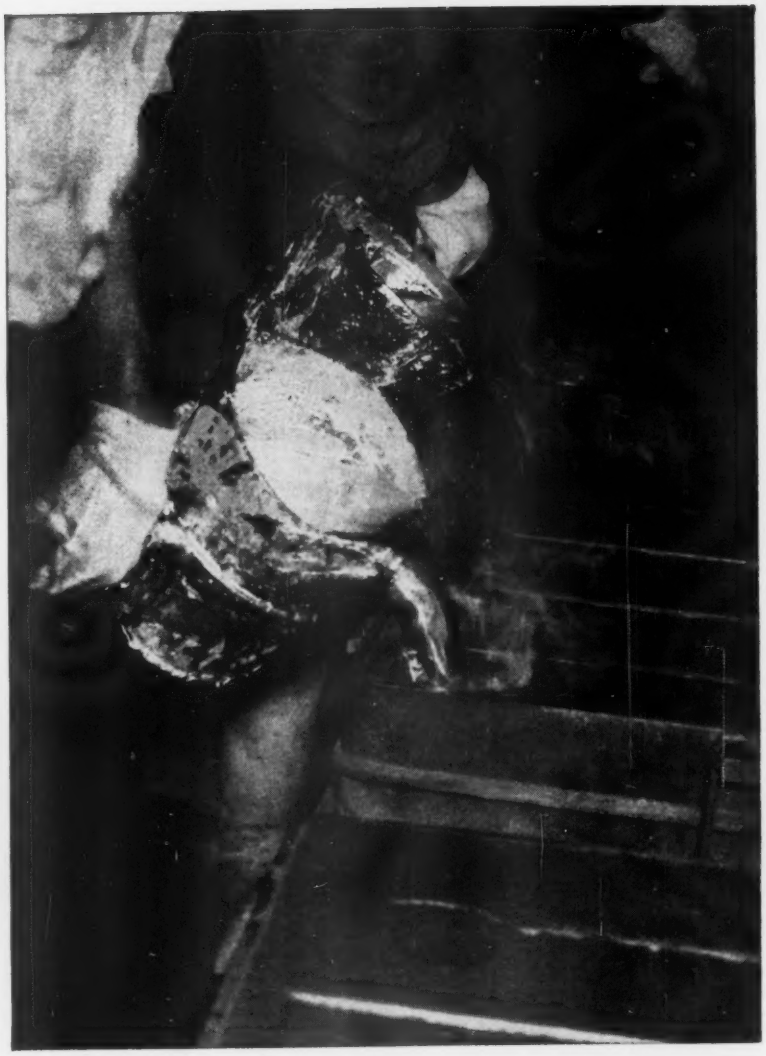
Defauts des Pieces de Fonderie (Defects in Castings) by H. LeBreton, cloth, 284 pages, 6 x 9⅜ in., published by Editions Eyrolles, 61 Blvd. St. Germain, Paris, France. Price 3045 fr, including postage and taxes. Written in French.

This book, subtitled Vol. I, relates only to those casting defects resulting from solidification phenomena. It is divided into two sections of which the first deals with defects due to diverse contractions of alloys and the second with those due to crystallization.

The first section contains five chapters. The first provides a general review of the physics and metallurgy involved. Second chapter discusses defects resulting from liquid contraction alone and use of feeding sprues or risers to overcome that trouble.

Those defects due to simultaneous effects of liquid and solidification contraction are considered in chapter three, which describes formation of shrinkage cavities, draws, intercrystalline shrinks or microshrinks as well as their elimination by use of risers, chills, etc. Chapter four pertains to defects due to solid contraction, such as cracks, internal strains, distortion, and hot and cold ruptures. Casting design to avoid occurrence of the various defects is discussed in chapter five.

Second section, on defects due to crystallization, contains seven chapters dealing with such subjects as a review of alloy solidification modes, grain size, segregation, incomplete feeding and filling of molds, cold shuts, and surface imperfections such as ripples or flow marks. The closing chapter discusses relations between designers and foundrymen to produce better castings.



Here are our published performance specifications for Federated Tenzaloy: Castings aged 10-14 days at room temperature.

Yield strength	35,000 psi
Tensile strength	25,000 psi
Elongation (in 2 in.)	4-5%
Brinell Hardness No.	74
Impact strength (Charpy in ft.-lbs.)	
Notched	3
Unnotched	14
Electrical Conductivity	35%

FEDERATED products:

Aluminum, Babbitts, Brass, Die Casting Metals, Fluxes, Lead and Lead Products, Magnesium, Plating Materials, Solders, Type Metals, Zinc Dust

Do you hear meaningless claims when you buy self-aging Aluminum Alloys?

Federated Tenzaloy is the most widely used of all high-strength, self-aging aluminum alloys because it has the highest yield strength, and it has the best all-around combination of properties. Yield strength is the true measure of a metal's ability to take punishment, regardless of other claims that are made.

When you buy Federated Tenzaloy, you can be sure it will perform as well as its specifications indicate. Tenzaloy is produced under the supervision of ASARCO's Central Research Laboratory, where refining and testing techniques control impurities to parts per million, if required.

Hundreds of foundries and manufacturers use Tenzaloy where heat treating is impractical because of casting design or size. Hundreds more cast Tenzaloy because heat treating facilities are not available.

Why not ask your Federated field man to tell you who uses this metal and how? He will be around to see you soon, and it will benefit you to talk to him.

Federated Metals

Division of

AMERICAN SMELTING AND REFINING COMPANY

120 BROADWAY, NEW YORK 5, N. Y.

FEF Plans College-Industry Conference in Cleveland

University training and foundry utilization of engineers will be discussed by school and industry representatives in Cleveland, March 13-14. The occasion will be the annual College-Industry Conference of the Foundry Educational Foundation. It will be held at Hotel Cleveland.

FEF president James H. Smith, Central Foundry Division, General Motors Corp., will open the two-day meeting at 11 a.m., March 13. Featuring the first day's program will be a panel discussion of the subject "Training Engineering Students in Cast Metals." With George K. Dreher, Steel Founders' Society of America, as moderator, the panel will include Warren C. Jeffery, University of Alabama; C. S. Crouse, University of Kentucky; B. W. Niebel, Pennsylvania State University, and J. F. Wallace, Case Institute of Technology.

As a follow-up to this discussion, another panel will take up the subject of recruiting, training and utilizing young engineers in the foundry industry. Moderator of this panel will be Howard F. Taylor, Massachusetts Institute of Technology, and speakers will be H. P. Skamser, Michigan State University; D. C. Ekey, Lebanon Steel Foundry; W. M. Dalton, Dalton Foundries, and B. C. Yearley, National Malleable & Steel Castings Co.

Among other scheduled speakers are Richard Meloy, marketing director, Gray Iron Founders' Society, and Colin Carmichael, editor, *Machine Design*.

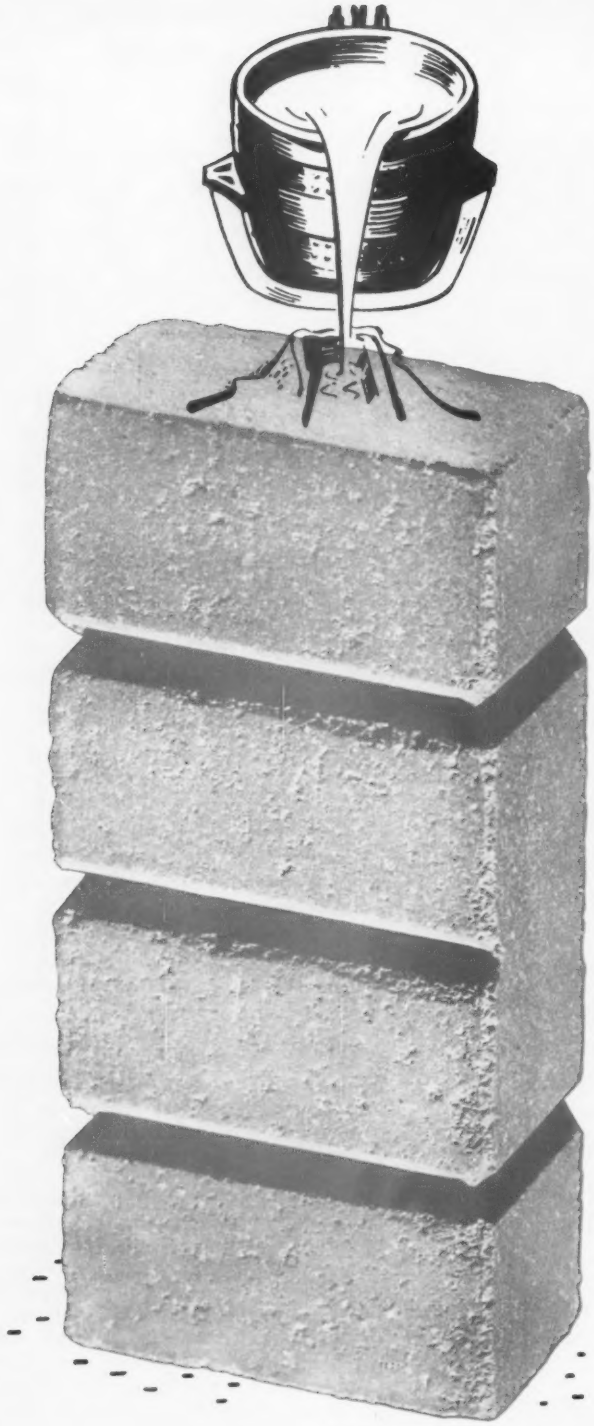
Annual meeting of the Foundry Educational Foundation will be held Wednesday afternoon.

FOUNDRY Index Is Ready

Index to FOUNDRY, Volume 84, listing by title, subject matter and author the editorial material published during 1956, is ready.

Readers find the index a ready reference to various phases of foundry practice, new techniques and recent developments in the industry and a quick means of locating information published during the year.

Subscribers may obtain copies without charge by directing requests to FOUNDRY, Penton Building, Cleveland 13, O.



GRAY IRON and Malleable Foundries find *Famous* CORNELL CUPOLA FLUX Improves the Quality of their castings!

Famous Cornell Flux purifies metal so that you pour clean metal every time. Sulphur is greatly reduced — there is less digging out and down time. Write for Bulletin 46-B or call in your helpful Cornell engineer.

don't accept substitutes!

Have you tried Famous Cornell Aluminum or Brass Flux for melting brass or aluminum? Write for Bulletin 46-A

The CLEVELAND FLUX Company

1026-40 MAIN AVENUE, N. W. • CLEVELAND 13, OHIO

Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes—Since 1918

FAMOUS CORNELL FLUXES

Trade Mark Registered

Industry Briefs

SLINGER Foundry Co., Slinger, Wis., will open a foundry and machine shop in Sparta, Wis., in a new building constructed with $130,000 raised by the citizens of Sparta. The new plant will employ more than 75 persons. Machining operations currently carried on at Menomonee Falls, Wis., will be discontinued after the Sparta unit becomes operative.

Union Carbide Research Institute has been formed by Union Carbide & Carbon Corp. to engage in basic scientific research. Its work will complement and extend that of the corporation's existing laboratories. Facilities of the institute, to be located near Tarrytown, N. Y., are expected to be completed early in 1958. Director will be Dr. Augustus Kinzel, vice president of research, Union Carbide.

Mexico Refractories Co., Mexico, Mo., has opened new offices in Edmonton, Alberta, and Winnipeg, Manitoba. This move completes the company's plans for direct representation in all eastern and western Canadian industrial areas. W. A. Sullivan Jr., who formerly represented the firm through its Edmonton warehouse distributor, heads the Western Canada Division.

Misco Precision Casting Co. has expanded operations and procured new facilities in Muskegon, Mich. A subsidiary of Consolidated Foundries & Mfg. Corp., Misco has production divisions in Detroit, Whitehall and Muskegon, Mich. Since 1948 the number of persons employed by the firm has risen from 26 to 1400.

Alhambra Foundry Co. Ltd., Alhambra, Calif., is having plans prepared for a one-story, 45 x 208 ft building.

National Roll & Foundry Division, General Steel Casting Corp., Avonmore, Pa., is installing a $\frac{1}{4}$-million roll grinding machine and has made other plant improvements costing about $1 million. In the iron foundry, a new sand loader was installed, two 30-ton overhead cranes were overhauled and modernized, new floors and walkways were built and a new pouring pit was installed. In the steel foundry, the old open-hearth furnace was removed and a second electric furnace installed. New transformer and substation equipment was installed. The stationary sandslinger was converted to a motive machine, and the molding area was relocated. New shakeout equipment and a hydraulic press also were installed.

Trabon Engineering Corp., formerly of 1814 East 40th St., Cleveland, recently celebrated the opening of its new plant at 28815 Aurora Rd., Solon, O. Located on 5$\frac{1}{2}$ acres, it covers 30,000 sq ft and was built at a cost of approximately $300,000. A plant tour and working demonstrations of Trabon automatic lubricating systems featured an open house which highlighted the opening.

Bigelow-Liptak Corp. has moved its engineering, sales and general offices to a new, company-owned building at 13300 Puritan Ave., Detroit 27. Completely air conditioned, the new structure contains more than 14,000 sq ft of floor space.

C. A. Norgren Co., Englewood, Colo., has purchased Stemac Inc., Denver die casting firm, and has changed the name of Stemac to Norgren-Stemac Inc. No change in operating personnel is planned. Everett McKenna and Earl Stevens, founders of Stemac Inc., will be operating vice presidents. Operations will continue from the present plant location.

Alaska Juneau Gold Mining Co. has purchased Reynolds Mfg. Co., a gray iron foundry at 600 North Prospect Ave., Springfield, Mo., for 2\frac{3}{4}$ million. No changes in management will be made, and Reynolds will operate in the same location as a subsidiary of the new owners.

H. K. Porter Co., New York, has acquired Mullite Refractories Co., Shelton, Conn., and will combine it with Porter's Laclede-Christy Division.

Johnston & Jennings Foundry Corp., Chicago, has bought the plant formerly occupied by Industrial

LOTS OF ALUMINUM: More than 100 lb of aluminum serve to power or decorate the new Chrysler New Yorker. The young lady is holding an aluminum die cast torque converter housing which is a part of the automatic transmission

Smelting Corp., 499 E. 16th St., Chicago Heights, Ill., and plans to convert it into a gray iron foundry. Its former foundry at 3320 S. Artesian St., Cicero, Ill., was destroyed by fire.

General Electric Co. has made the Edmore, Mich., plant of its Metallurgical Products Department the Magnetic Materials Section of the department. The decentralization move is expected to permit faster, more efficient service for customers. General manager of the new section is E. E. George, formerly plant manager.

Flick-Reedy Corp., Melrose Park, Ill., will build a $2,300,000 plant in Bensenville, Ill., on a 96-acre tract. The new facility will boost its production capacity for industrial hydraulic and air cylinders by 70 per cent. Upon its completion, the company will move operations from the present Melrose Park facilities. Miller Fluid Power Co. is a division of Flick-Reedy.

Air Reduction Sales Co., a division of Air Reduction Co., New York, has doubled capacity at its air separation plant at Butler, Pa. The plant produces liquid and gaseous oxygen, nitrogen and argon.

Metal Treating Institute reports November, 1956, billing by member companies of $3,205,700, an increase of 9.2 per cent over the same month in 1955. Total billing for the first 11 months of 1956 was $34,156,000, 22.5 per cent more than the same period in 1955.

Herman-Ashby Co. has been formed to represent Alliance Machine Co., Alliance, O.; Union Electric Steel Co. and F. Tinker & Sons, Pittsburgh; Davis Fire Brick Co., Oak Hill, O.; Oswald Refractories Co., St. Louis; Smeeth-Harwood Co., Chicago; and S. P. Kinney Co., Carnegie, Pa. The new firm will have offices in San Rafael and Altadena, Calif.

Surface Combustion Corp., Toledo, O., will add a 12,400-sq-ft Engineers Building to its Toledo plant facilities. The company recently completed addition of a 20,000-sq-ft manufacturing plant in Toledo and has broken ground for a new 43,000-sq-ft plant for Webster Engineering Co., Surface Combustion-owned Industrial Burner Division, Tulsa, Okla.

Perfect Circle Corp., Hagerstown, Ind., has signed an agreement with Automotive Components Ltd., Sydney, Australia, for the manufacture of the company's piston rings in Australia.

J. H. Day Co. Inc., Cincinnati, has been merged with the Cleveland Automatic Machine Co., both of Cincinnati, and will be operated as a division of the latter. Cleveland Automatic, owned by R. K. LeBlond Machine Tool Co., Cincinnati, manufactures automatic screw machines and die casting machines. Day builds processing machinery.

Minnesota Mining & Mfg. Co., St. Paul, has announced that the 22 distributors of its barrel finishing materials have added the lines of four equipment manufacturers—Speed-D-Burr Corp., Glendale, Calif.; Metal Finish Inc., Newark, N. J.; Rampe Mfg. Co., Cleveland; and Crown Rheostat & Supply Co., Chicago.

Clark Controller Co., Cleveland, has opened a new sales office in Baltimore. Edward M. Hanson, recently with Clark's Philadelphia office, is in charge. Canadian Controllers Ltd., a Clark subsidiary, recently opened a new 70,000-sq-ft plant in Scarborough, Ont.

National Research Corp., Newton Highlands, Mass., has changed the name of its Equipment Division to NRC Equipment Corp. A 20-percent increase in manufacturing area nearing completion at NRC's Newton Highlands plant will bring its space to nearly 55,000 sq ft.

Thor Power Tool Co., Aurora, Ill., has opened its 27th branch office, at 2024 Chamberlayne Ave., Richmond, Va. It will serve most of Virginia, the southern portion of West Virginia and all of North Carolina. Kenneth V. Bennett is manager.

HOW TO DO IT

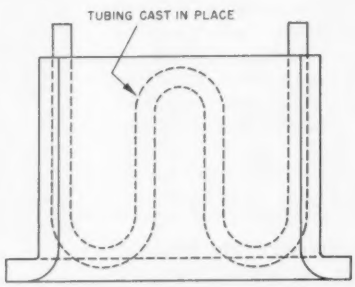
Compressed Air Cools Copper Tube As It Is Being Cast into a Part

By JAMES A. REYNOLDS
Eccleston Park
Lanes County, England

COLLAPSE OF COPPER tubing when casting it into a copper or aluminum part can be prevented by passing compressed air through the tubing during pouring of the mold. The air keeps the tubing from melting or collapsing until the casting metal has solidified.

The clean, dry tubing is placed in the mold so that both ends protrude outside the flask. A hose carrying compressed air, preferably at 80 psi or above, is connected to one end. Air flow is started two or three minutes before the mold is poured and continued for some time after the casting has set.

The tubing is used in parts which are to be water cooled, such as electrodes for resistance welding, mill bearings or flexible terminals for electric furnaces. The illustration shows tubing cast into a mill bearing.



Do you have any tricks of the trade tucked away with your foundry experience? Why not release them to fellow foundrymen? FOUNDRY will pay a minimum of $15 for each idea submitted and published. Send a photo or drawing with your idea

LOOK UNDER THE HOOD.....see the reason ALLIS-CHALMERS fork trucks outperform from the start

No matter how you look at it, fork truck performance starts with the engine. That's why you can expect an Allis-Chalmers fork truck to outperform *right from the start.*

Allis-Chalmers engines are real heavy-duty, industrial-type — the strongest and most rugged used in a fork truck. Every part is built to exceed maximum wear and stress expectancy, putting thousands of extra work hours into Allis-Chalmers fork trucks—keeping them on the job.

But durability is only part of the story. Compare an Allis-Chalmers fork truck in material moved per hour and you will quickly see what an engine with extra usable torque and responsive acceleration can contribute. Here is power to outproduce!

Like the entire truck, Allis-Chalmers engines are built for quick servicing, too, and are so simple to repair they can be completely overhauled *without removal from the truck.*

Since Allis-Chalmers builds its own engines, (gasoline, diesel and gas), they are interchangeable in the trucks — and you will find an amazing 85 percent parts interchangeability.

Send for literature, or ask your Allis-Chalmers material handling dealer to tell you more about this power to outperform — plus the other outstanding features of Allis-Chalmers fork trucks.

MATERIAL HANDLING DEPARTMENT, BUDA DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

BH-38

New Safety Code Issued on

ABRASIVE WHEELS

THE American Standards Association, on Oct. 26, 1956, approved the revised edition of the 1947 Safety Code for *The Use, Care, and Protection of Abrasive Wheels.* This revision was made under the sponsorship of two organizations: International Association of Governmental Labor Officials and the Grinding Wheel Institute.

This new abrasive wheel safety code represents a major revision of its 1947 counterpart. Some of the major changes are listed below:

New Size—The new code measures a standard 8½ x 11 in. to facilitate binding, filing, etc.

New Format—The most striking change in the new code is its unique two-column format. Code regulation material appears in the left-hand column on each page and is printed in distinctive bold type. Drawings, half-tones, etc. which are part of the code are designated as *Figures.* The right-hand column contains explanatory information only and is so marked. Material in the explanatory column appears only to explain in simple language the extent of the code regulations. The drawings and halftones in this column are identified as *Illustrations.* This new two-column format makes the code easier to use and the code regulations more readily understood.

Changes in Content—Many changes in content have been made. Because of space limitation, only those which can be considered major are listed below.

1. Section 1 (beginning on page 9): This section has been rearranged to facilitate location of material. Definitions have been added for depressed center wheels, reinforced wheels, and revolving cup guards.

2. Table 1 (on page 22): This has been revised and expanded to make it more useful to the machine designer.

3. Page 29 contains, for the first time, information on the very popular "Revolving Cup Guard" used on portable grinding machines.

4. Page 40: The new Table 10 contains information necessary for the fabrication of a drawn steel guard for portable grinders.

5. Section 8: Speed (page 52) has been rearranged and a number of new items added. The old speed table has been broken down into two tables, one for "Standard Maximum Speeds" and another separate table for "Special Maximum Speeds." Maximum speeds have been established for two new classes of wheels —the "Reinforced" type and the "Depressed Center" type. The conditions under which grinding wheels may be run at high speeds have been clarified and strengthened.

6. Section 9: General Operating Rules (page 56) has been expanded. A discussion of the steps to be taken by the wheel user after an accidental wheel breakage has been added in the explanatory column. This information should materially aid in the elimination of recurrence of grinding wheel breakages.

7. Section 10: Mounted Wheels (page 59) has been revised to facilitate users correct application of this class of product. The old "Critical Speed" tables have been replaced by easy-to-use "Maximum Speeds" tables.

Headquarters of the Grinding Wheel Institute are 2130 Keith Bldg., Cleveland 15.

Steel Founders Open Seventh Safety Poster Contest

The seventh annual safety poster contest for member companies of the Steel Founders' Society of America has been announced by the SFSA national safety committee. The contest is conducted within the eight divisions of the society. Judging of divisional entries will take place at the March meetings of the Technical and Operating groups. The winning divisional posters will be forwarded to the national office for judging by the safety committee and subsequent national awards and recognition.

Posters can be submitted by full-time employees of member companies and must represent their personal work. In the 1956 competition, 327 posters were submitted by employees of 72 member foundries. Posters receiving awards in the national contest subsequently are reproduced by the SFSA under the guidance of the safety committee and are forwarded to member companies for use throughout their plants.

Circle 644 on Inquiry Card→

NOW! CLEANING COSTS DROP AGAIN

NEW and BIGGER SAVINGS effected in 5 areas by the new WHEELABRATOR® SUPER TUMBLAST

"Abrasive costs reduced 68% . . . no direct labor required for cleaning . . . original blades last 696 hours . . . castings cleaned 20% faster . . . no parts replacement required in first 2 months . . . blade costs cut 66.2%." Reports like this keep coming in from Super Tumblast installations in the field. Savings pile on savings. Operating economies, maintenance savings and increased productivity are combined in the Super Tumblast to give a new dimension to blast cleaning.

cleaning time drops again

The Super-Capacity Wheel throws more than twice the abrasive in a more uniform pattern than any similar sized wheel previously used. Contaminants cannot retard cleaning because the abrasive separator, with 3 times the air separation area, assures having super-clean abrasive at all times.

parts costs drop again

The Super-Efficient Separator removes all highly-abradant contaminants before they can damage machine parts. The entire efficiency of the machine is thus increased, downtime is kept to a minimum and large savings are effected in parts costs.

abrasive cost drops again

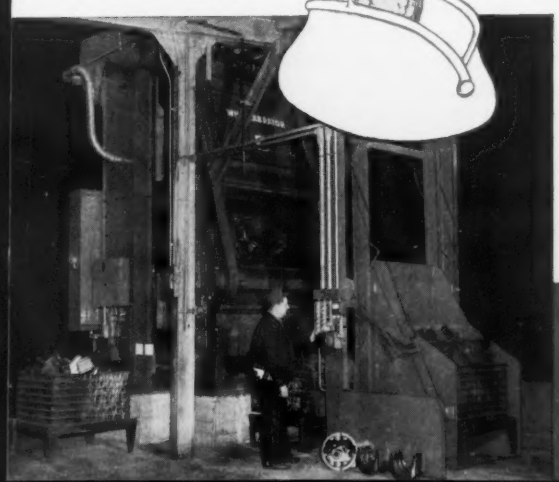
The Super Tumblast gets more mileage from abrasive in 2 ways: First, it keeps all abrasive in the machine through a new Super-Sealed construction. Second, it removes all contaminants from the abrasive without removing any of the abrasive itself.

maintenance costs drop again

The entire Super Tumblast is designed for lowest maintenance. For example—high wear points are protected by Long-Lyfe liners with 25 to 50 times longer life. The cleaning chamber is super-tight. The power-operated, one-piece reinforced door withstands impacts from inside and outside. The wheel has new blades for longer wear, a strain-free blade holding device, a new easy-service wheel guard housing, and a new system of wheel guard liners.

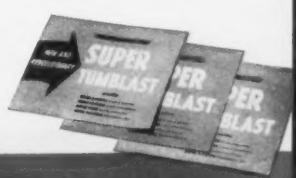
man hours drop again

This is the first batch-type mill designed to provide the reliable performance required for automatic operation. It is readily converted to automation because of standard features such as power door, power closing plate, power abrasive controls, etc.



SUPER TUMBLAST now in 3 SIZES

Super Tumblast super savings are available to more plants because it comes in 3 sizes . . . 7 cu. ft., 14 cu. ft., 28 cu. ft. Write for literature.



WHEELABRATOR®
CORPORATION
505 South Byrkit Street, Mishawaka, Indiana

GIANT EARTHMOVER—Construction equipment like this helps the nation meet the need for new super highways. Castings are vital in the manufacture of such equipment.

TRULINE® HELPS PREVENT FOUNDRY ROADBLOCKS

Truline Binder is playing an important role in helping foundries meet the challenge of near capacity work loads.

In the core room, in the molds, in the cleaning room—every step of the way—Truline has proved its ability to increase efficiency, reduce man-hours per ton.

Among Truline's many advantages is its quick bake which permits you to almost double oven capacity. Add to that the fact that Truline produces strong cores with superior collapsibility and you see why so many foundries today rely on Truline to meet production schedules. For quick bake, less breakage, less repairs in the cleaning room, you can count on Truline. We'll be glad to discuss how Truline can help you. Write for information:

HERCULES

Pine Chemicals Division, Naval Stores Department

HERCULES POWDER COMPANY

INCORPORATED

920 King Street, Wilmington 99, Del.

NF56-2

Man to Man

RALPH L. LEE

"Maybe it's the adventure of the foundry that gets into your blood—and the loopholes which it affords for pulling rabbits out of a hat"

What a Day!

FROM what I read and hear, most foundrymen, and other people, too, have their good days and their bad. I've just had a stinker—"Old Low-Ebb Lee," they're beginning to call me. All I wanted to do was to make three sets of castings from four patterns I had just finished. I had taken particular pains with them —draft, fillets, fairly uniform sections, and sanding and varnishing done right down to a fare-thee-well.

With three in one flask, a song on my lips and conscience clear, I went to work on the molding job, first getting the sand in shape, of course. I didn't hurry, and, remembering what I had been taught and had learned from experience, I did the very best I knew how.

When I lifted the cope, it didn't part clean; sand stuck on one side of two of the patterns, which I would have sworn I had checked and double-checked for draft. On the second try, the sand stuck in the same places. I marked these places on the patterns and took them to the pattern shop, where I made doubly sure that the draft was foolproof. It's mighty comforting when you can take liberties with pattern dimensions without asking anybody.

Still no soap, even after the third and fourth try. "Now," I said to myself, "could it be the sand? Feels moist enough, but sort of brittle." Since my molding operations are spasmodic, to say the least, and considerably on the small-quantity side, I've been cutting down on the amount of sand in my heap. "What's the use," I reasoned, "of shoveling loads of sand each time I mold when I usually need only a little bit?"

A Case of Weakness—It suddenly occurred to me that this little, peewee heap was getting a pretty rugged turnover and that maybe the clay in it (Albany No 0) was on the ragged edge of giving up the ghost. I checked the moisture content, which proved to be on the high side. Checked it again to be sure. Then I ran a specimen through the new Lee Hobby Foundry sand tensile tester, which I should have done before starting the whole project. The tensile strength turned out to be 5.12 oz per square inch on the first test and 5.05 on the second—weak, to say the least.

With Sherlock Holmes zeal, hot on the trail of a promising clew, I went to the silo and got me some brand new Albany No. 0. Being in a hurry I mulled it instead of riddling it, as I usually do, checked the moisture (8.2 per cent) and ran a tensile which came out 10.2 oz per square inch. Eureka, I had found it! The new sand was twice as strong as the old.

So I replaced the sand in my old heap with the new, added the exact amount of water (by weight) and riddled and riddled. To be on the safe side I left the new heap covered with a discarded shower bath curtain overnight to temper.

Bright and early the next morning (about 11—I'm on the late shift), I rolled up my sleeves, but thought I'd check the moisture just for the heck of it. It was over 9 per cent. I had assumed that the new sand in the silo was dry, but it wasn't. A very good lesson. Well! anyway I resumed the molding operation and doggone my old hide if the sand didn't stick in the same spots it had on the very first try.

That old devil sand trouble shows up

The Solution at Last—As I usually do when I can stand the gaff of disappointment, and I usually can, I found my trouble. The flask pins had gradually worked slaunch-wise, both in the same direction. Feeling rather sheepish, I trued 'em up, went ahead and got all good ones.

Fortunately, I hadn't thrown the old sand out. I'm glad I didn't, for it has occurred to me since that I had mulled the fresh sample before tensile testing. Ordinarily I riddle the sand. I have a hunch that the strength of Albany goes up with mulling. I've never got into the subject, so now I really don't know whether the seeming greater strength of the new sand was due to newness or mulling. It could be that the old sand isn't as bad off as I thought it was. Guess I'll have to get on the job and really find out.

I appreciate, of course, that being only an amateur, I am bound to have troubles that professionals never run into. I can't help think, however, that with so darned many things which can go wrong in so many degrees, at so many places and at so many different times, it's amazing how many good castings we do get. One thing seems to be sure—that in spite of all our splendid efforts at fact finding, rule setting and slide-rule slipping science, there are going to be enough ever-changing variables in this foundry business to keep it pretty much of an adventure, with feel and hunch part and parcel of it. Maybe it's

IMPROVE YOUR MIXING & APPLICATION OF GREEN PATCH REFRACTORIES MATERIALS

For Cupola Patching and Ladle Lining
Bonnot Mechanical Mixing Affords
Many Exclusive Advantages

PLUS IMPORTANT SAVINGS

BONNOT TERRIER Mixer-Extruder is designed from 65 years of experience in developing processing machinery; is engineered for practical foundry service.

1. **Greatly Reduced Labor Mixing Cost**—One man with Terrier mixes more in 1 hour and does it vastly better than can be done manually in several hours—thus saving a lot of labor.
2. **Easily Delivers Each Hour, 4000 lbs.** of well mixed material in slab form:
   - Simple die changes provide sizes from 2″ to 8″ wide—1″ to 6″ high—lengths cut to option of user.
   - Dies for solid cylinders or other shapes readily available.
3. **Uniform Mix with Balanced Moisture** throughout mass assures minimum slippage, erosion, slagging, spawling.
4. **Ease of Application**—More uniform liner thickness due to preforming, presizing—convenient handling and fitting—greater ease of sealing joints.
5. **Slabs can be Conveniently Stacked and Stored** for weeks without sticking or deterioration.
6. **Handles Wide Range of Patching Materials** having proper plastic content.
7. **Machine is Self-Contained:** complete with motor, reducer, starter, hopper, cutting or sizing table, paper dispenser for automatic slab separation.
8. **Compact Size and Weight** permit moving to different locations—water and power are only connections needed.

Larger sizes and vacuum mixing types are available if needed . . . and the same process is usable in the steel and other industries employing plastic refractories. **Process can be demonstrated and samples provided (from your material if desired) by commercial unit in foundry at our plant.** TELL US YOUR NEEDS OR ARRANGE FOR DEMONSTRATION.

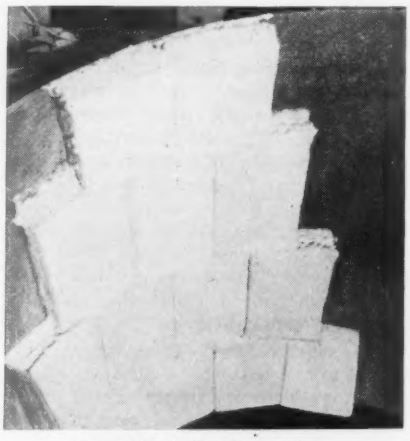
BONNOT TERRIER Mixer-Extruder

- ***Modestly Priced***
- ***Pays Its Way***
- ***Easily Operated and Maintained***

The BONNOT Company
Canton 2, Ohio

Here's a Bonnot Terrier in use.

Liner applied to half of 1 ton ladle; note smooth, unbroken surface.



Beginning to line 8 ton ladle with slabs from machine.

the adventure of the foundry craft that gets into your blood—and the loopholes it affords for pulling rabbits out of a hat every once in a while, against reason, statistics and beautifully plotted curves.

I feel better now that I've told my tale of woe and admitted that my recent troubles were of my own making—just dumbness, in fact.

Birmingham Meeting Planned By Southeastern Foundrymen

Twenty-fifth annual Southeastern Regional Foundry Conference will be held at the Tutwiler Hotel, Birmingham, Thursday and Friday, Feb. 21-22. As in recent years, the meeting will be sponsored by the Birmingham District and Tennessee Chapters of the American Foundrymen's Society.

Thursday and Friday afternoon will be devoted to technical sessions, with plant visitations scheduled for Friday morning. A luncheon on Thursday will be addressed by national officers of AFS. Speaker at the annual banquet Friday evening will be Harry Stuhldreher, United States Steel Corp. A special entertainment program for ladies also is planned.

Technical papers to be presented and speakers are:

Thursday, Feb. 21

Some Sand, Some Metal, Some Man-Made Defects, by C. A. Sanders, American Colloid Co.

Cost Control Methods in the Foundry, by C. E. Westover, Westover Engineers Inc.

Epoxy Resins in Pattern Applications, by T. O. Mahaffey, Kish Resins Inc.

Gating and Risering, by Harry Kessler, Sorbo-Mat Process Engineers.

Air Pollution Control Equipment for Cupolas, by R. C. Ortgies, American Air Filter Co.

Friday, Feb. 22

Production Experience with Carbon Dioxide Cores, by Frank Scaggs, Oklahoma Steel Castings Co.

Operating a Basic Water-Cooled Cupola, by A. P. Alexander, International Harvester Co.

Common Sense in the Coreroom, by Warner B. Bishop, Archer-Daniels-Midland Co.

Highlights of Modern Brass and Bronze Foundry Practice, by Harry M. St. John, consultant.

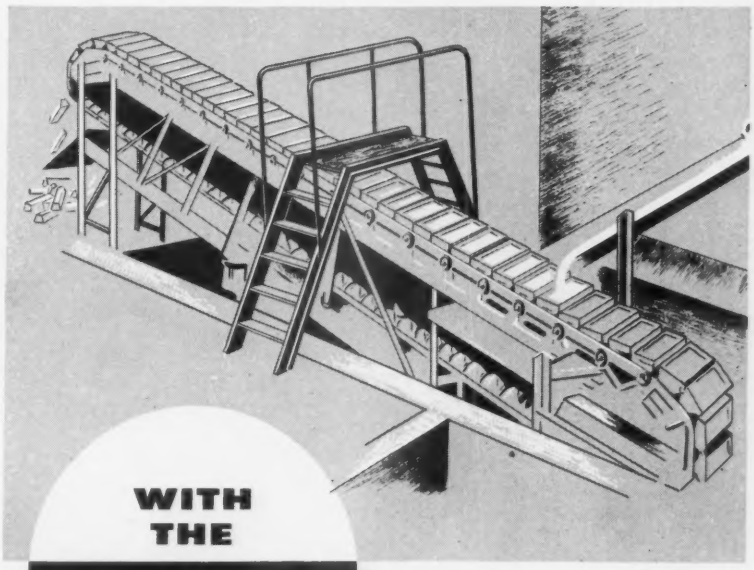
Brass Melting Practice, by Fred Riddell, H. Kramer Co.

Book Review

Metallurgy by Carl G. Johnson and William R. Weeks, cloth, 454 pages, 6 x 8¼ in., published by the American Technical Society, 848 East 58th St., Chicago 37, Ill. Price $5.50.

This book is a survey text that stresses the importance of the chemical and physical properties of metals to those interested in the design, shaping, sizing and fabrication of metal products. Information on bearing alloys, aluminum alloys, alloy steels, copper and copper alloys, cast iron and heat treatment is included. Methods of production, physical and mechanical properties and uses of titanium, zirconium, indium and vanadium also are presented.

Simplify Pig Casting Operations . . .



WITH THE

Bailey PIG CASTING MACHINE

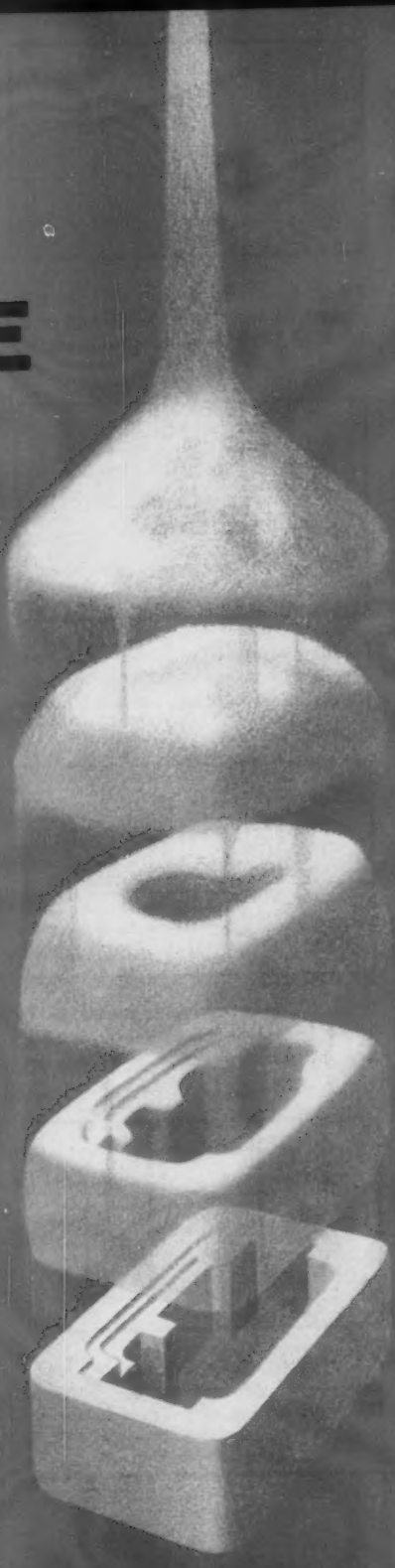
- 80% of moving parts eliminated by stationary wheel design
- Capacities from 3 to 50 tons per hour
- Lengths: 15 to 125 feet, in multiples of 5 feet

The unique "stationary wheel" design greatly increases service life and pig casting economy for foundries and small metal producing plants. With this design the roller bearing idler wheels are mounted on the frame rather than on the moulds— thus keeping them far as possible away from hot metal.

WILLIAM M. Bailey COMPANY
ENGINEERS
LEADERSHIP THROUGH QUALITY
1221 BANKSVILLE ROAD PITTSBURGH 16, PA.

MECHANIZE WITH OSBORN

Osborn's ROTA-LIFT® is a profitable asset in any jobbing or semi-production foundry



The Rota-Lift's ability to handle large match plate patterns mechanically permits economical production of molds formerly considered too large. Moreover, the versatility of the Osborn Rota-Lift makes it possible to handle a wide variety of work.

Write for Rota-Lift Catalog 25A. *The Osborn Manufacturing Company, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

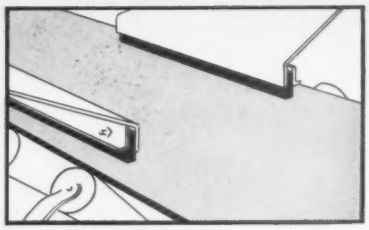
Leader in mechanization for the foundry

OSBORN®

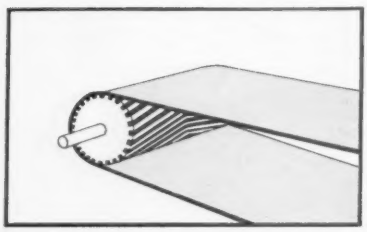
MOLDING MACHINES
CORE BLOWERS
INDUSTRIAL BRUSHES
BRUSHING MACHINES

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

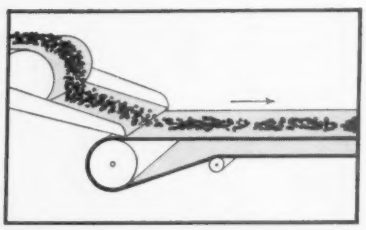
Circle 647 on Inquiry Card—Page 209



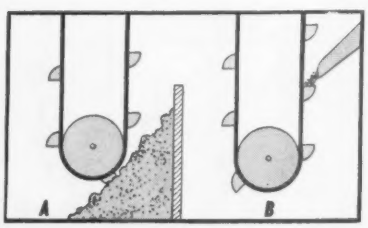
Place lower edges of skirt boards closest at back and a bit higher in front of load chute to stop wedging



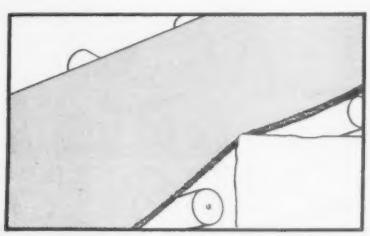
Lagging material should be made from length of canvas belting or rubber; it cuts down slippage at head pulley



It is desirable to have a belt or a chute to angle falling material onto belt in same direction it is moving



A—To avoid strain, do not overload chute for elevator belts. B—With fly feed, chute fills second bucket



Belt installed too close to a projection may rub it because an unequally loaded belt may climb idlers

How To Prolong the Life of

CONVEYOR BELTING

By JOSEPH E. HOLLAND
C. R. Daniels Inc.
Daniels, Md.

THE two greatest enemies of belt life are neglect and abuse. High-grade belting is built to take the beatings that come to it in legitimate line of duty—the stresses, the strains, the friction, the temperature variations, and the brunt of all the hazards it has been designed to overcome. But it will not take neglect of the few slight things that are necessary for its proper care and maintenance.

Most of the things that make a belt wear out too quickly are not inherent in the belt itself, nor are they due to the continuous arduous labor of the belt's rated task. A worn head pulley lagging, and not the day's work, is what can really shorten the life of a belt, while it keeps on trying to do what you handicap it from doing.

In the instance of a conveyor that handles foundry sands, roasted ore, etc., at viciously high temperatures, you can watch a belt perform efficiently what seemingly should be an almost impossible task. Is it not only fair that the belt should receive, in return, an "assist" against this extreme heat by getting regular treatments of insulating compound as part of the maintenance program?

In the case of elevator belts, here are some of the things which can be done to prolong belt life.

Frequent Inspection — Detecting mechanical defects in equipment often results in longer life by as much as 50 per cent, and inspection should be made for the following conditions:

a. Worn head pulley lagging.
b. Loose buckets.
c. Worn and loose fasteners.
d. Congestion.
e. Buckets scraping bottom of boot.
f. Careless splicing and maintenance of splice.
g. Slippage. Belt slippage is hazardous and is a possible cause of fires or the burning of the belts by friction, resulting in either short life or complete destruction. While most head pulleys are lagged, lagging often becomes worn, allowing bolt heads in lagging to protrude sufficiently to come in direct contact with the belt in an injurious manner.

Buckets should never be allowed to scrape the bottom of the boot. Scraping can damage buckets, cause excessive load strains, or result in accidents contributory to early belt destruction.

Belts are designed to perform their work smoothly and automatically, provided extraneous obstacles are not put in the path of their duty. In the case of conveyor belts, such obstacles can be:

a. Improper tension.
b. Improper splicing.
c. Poor alignment of belt near trippers.
d. Incorrect skirt board adjustment.
e. Load balance unequalized.
f. Incorrect idler adjustments.
g. Incorrect load angle.
h. Insufficient protection against projections.
i. Insufficient and/or inefficient lagging.

The moving belt can take more than its share of wear and tear from friction caused by grit, sand, dirt, rocks, etc. The belting's underside, however, should be kept free of dirt and grit. When such abrasives get between the belt and the pulley face, they ruin the belt's complexion, as well as the pulley face. A pitted pulley face makes a good grater or shredder. Cleanliness is a great youth preserver in all types of conveyor or elevator belting.

Lubrication — It is essential that pulleys and idlers receive proper lubrication, not only for the sake of the belt but for the sake of the pulley itself. Lack of lubrication on an idler causes that idler to stick. The moving belt wears the metal away; gives it a rough face. The idler then gets back at the belt by tearing the belt, which has to move against this roughened surface. Result: "Mileage" of the belt is reduced and the

Best where the going is toughest!

THOR CHIPPING HAMMERS

with the plate valve that never wears out

When you are looking for an air chipping hammer with real stay-on-the-job durability you'll choose Thor every time.
Thor air chipping hammers are famous around the world for stamina, economy, ease of operation and a big plus of power.
Five sizes of hammers are available with open handles or closed handles with triggers.
Ask your Thor factory representative for a demonstration. Thor Power Tool Company, Prudential Plaza, Chicago 1, Illinois.

THOR POWER TOOL COMPANY
CHICAGO

Thor
PORTABLE POWER
TOOLS

Atlanta • Birmingham
Boston • Buffalo
Chicago • Cincinnati
Cleveland • Denver
Detroit • Houston
Indianapolis • Kansas City, Mo.
Los Angeles • Milwaukee
Newark • Long Island City, N.Y. • Philadelphia
Pittsburgh • Richmond
St. Louis • San Francisco
Seattle • Toronto, Canada
Export Division, New York City

DO YOU KNOW?

The ONLY complete line of

ADJUSTABLE

and

SELF ALIGNING

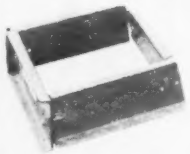
Slip Jackets

is manufactured by

Products Engineering Co.

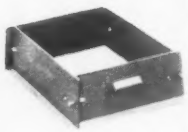
Cape Girardeau, Mo.

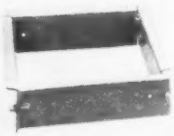
Pats. Pend.



Type I
3/16" Steel
"Eliminate Shifts"

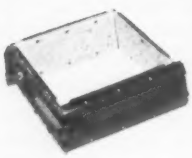
Type II
¼" Steel
"Reduce Crushes"

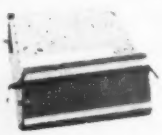




Type III
¼" Steel
"Fewer Run-outs"

Type IV
10 Gauge Steel
¼" Transite
"Less Maintenance"





Type V
3/16" Steel
½" Transite
"Lower Costs"

- The only jacket which is adjustable to fit different size molds—just drill more holes for more sizes.
- The jacket is self-aligning with controlled flexibility.
- All sides are replaceable and can be interchanged with others.
- Transite liners are easily replaced with stove bolts.
- Metal catching lugs have been eliminated so the jacket operates longer. Maintenance is easy as this is the only flexible jacket whose sides will lie flat.

For additional information write—

Products Engineering Co.

Cape Girardeau, Mo.

Name _____

Company _____

Address _____

City-Zone-State _____

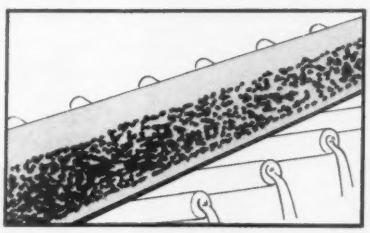
Circle 649 on Inquiry Card—Page 209

day when it must be replaced draws nearer.

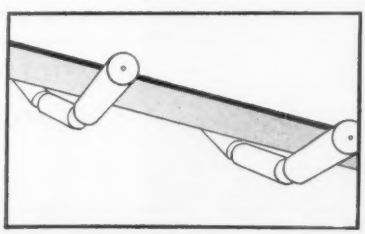
The fraction of a second's time saved in not putting a drop or two of oil or grease on the idler will not compensate for this dollars and cents loss of belt mileage.

Correct Tension—Just as the golfer gets the most out of his swing when his tension and timing is right, the belt gets its most efficient action when just tight enough for maximum power. Too tight tension causes a continuous heavy load in itself and also strains the driving machinery. Too little tension reduces efficiency of the drive pulley due to slippage and consequent belt wear at that point. Loose tension on elevator belts increases the arc of the bucket swing, causing strain on bucket bolt attachments.

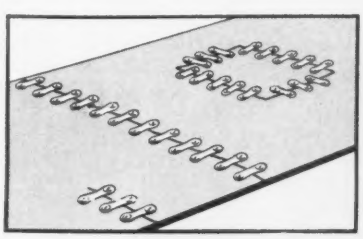
Alignment—Do not give the belt a wrong steer by misaligning these guiding protectors. When a belt starts to climb out of line, that is



A belt will run crooked when loaded unevenly. Light side tends to climb idlers, causing wear on heavy side



Idlers will stick or clog because of falling material or improper lubrication; they then may tear belt cover



Inspect and replace metal fasteners before they fail. Stitched canvas belting will outwear the fasteners

Produce More *Top Quality* Castings

with *Top Quality* FOUNDRY MATERIALS

Use these Time-Tested Products for Best Results

SAND

Portage (Wis.) Silica
Century Molding
*Ottawa Blackhawk Silica
Muskegon Lake Sand
Tenn. & Ind. Molding
Utica Crude Silica
Green Lake Shell
*Zircon Sand, Flour and Wash
Berlin Core Sand
Red Flint Annealing
New Jersey Molding
Gallia Red Molding
Albany Molding

BONDING CLAYS

*Volclay, MX-80 (Granular)
*and Panther Creek Bentonite
*Goose Lake Fire Clay
*Grundite Bonding Clay

ABRASIVES

*Tru-Steel Steel Shot
Mallan' Steel Shot and Grit
*Malleabrasive Shot and Grit
*Certified Shot and Grit
*Blackhawk Sand Blast Sand
*Super-Titan Nozzles

REFRACTORIES & MISC.

Cargan Cupola Gun Mix
Firegan Ganister
*Microsil Silica Flour
Fluxing Limestone
*Five Star Wood Flour
*Sultron Foundry Flux
Fluorspar—Lump & Gravel

*** Whse. Stocks carried**

CARPENTER BROTHERS INCORPORATED

Main Office: 606 W. Wisconsin Ave.
MILWAUKEE 3, WIS.
Tel. BRoadway 6-0140

BRANCH OFFICES

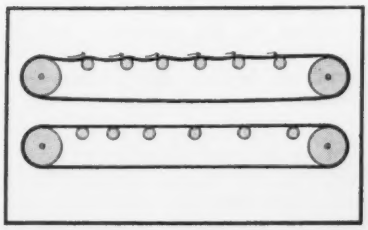
ST. PAUL, 5
1803 Princeton Ave.
Tel. Midway 9-6312

MUSKEGON
1209 Moulton St.
Tel. 4-7248

Circle 650 on Inquiry Card—Page 209

the signal to straighten things out.

Every belt has a big job to do, and a high-grade belt will do it. For a care and maintenance program,



Closer spacing of idlers at end of belt opposite where power is applied reduces belt wear and saves power

there is just a little job to do, and the reward is not just extra belt life mileage, it is plenty of extra mileage. The tools: Regular inspections geared to a check-up list. The sad part is that because a high-grade belt needs so little attention, it often gets too little.

Air Pollution Problems Are Discussed in AFS Manual

The American Foundrymen's Society has published an *Air Pollution Manual*, the first engineering manual for control of air pollution from foundry operations.

Rapid development of local and state air pollution ordinances in recent years has caught both foundries and enforcement officials with inadequate data on cause, effect and control of air pollution.

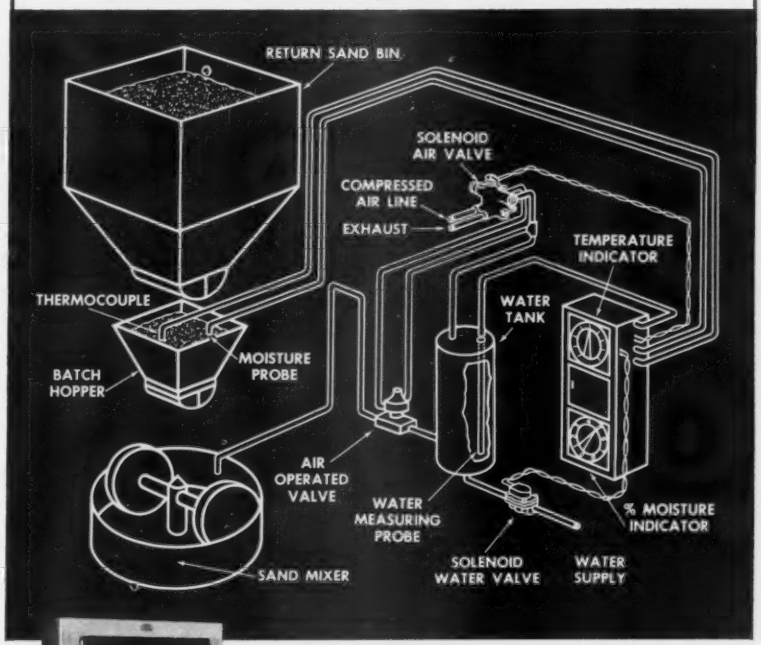
The newly published AFS manual is intended to be helpful to officials charged with development of ordinances equitable to both communities and industry. It also provides foundry management with up-to-date information on how to evaluate an air pollution situation, engineer its control and maintenance, and select equipment and materials on the basis of local atmospheric and related conditions.

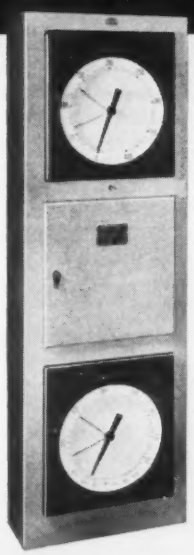
The manual follows recent publication of the society's *Ventilation and Dust Control Manual*. Where the latest manual deals with external foundry plant discharge, the earlier publication covered control of environmental or interior working conditions.

Sections of the book cover: Foundry Industry's Air Pollution Problem; Review of Existing Ordinances; Community Relations; Atmospheric Sampling and Analysis; Air Cleaning Equipment; and Operating Methods, Improvements and Maintenance.

Cut Scrap Loss

and boost output at less cost





with Automatic

SAND TEMPERING

by DIETERT-DETROIT

Modernize now! Keep pace with today's industrial trends. Automatic Dietert-Detroit sand control equipment improves casting quality through uniformly tempered sand. Scrap losses are cut and production boosted with no down time.

A molding sand control program is easier and more effective, in terms of casting quality, when moisture is maintained at the correct level.

Dietert-Detroit equipment is adaptable to a wide variety of foundry operations, including skip hoist, overhead batch, and the continuous type. Every installation is guaranteed. Prompt service is assured through our own skilled engineering staff.

HARRY W. DIETERT CO. *Control* EQUIPMENT F.

HARRY W. DIETERT CO.
9330 Roselawn Avenue, Detroit 4, Michigan
Send me data on Dietert-Detroit sand tempering controls.

NAME_____ TITLE_____

ADDRESS_____

CITY_____ STATE_____

FOR HEAVY DUTY FOUNDRY SERVICE AT A SURPRISINGLY LOW PRICE...

Lodestar®

ENTIRELY NEW
differently NEW

CAPACITIES: from ⅛ to 1 ton. 110-220-440 volt current. ¼ ton model weighs only 51 pounds.

$149.50 and up

...THE FIRST TRULY "HEAVY DUTY" VERSION OF THE SMALL ELECTRIC HOIST

Featuring:

- Push Button Control
- Self-Adjusting Heavy Duty Brake
- Sealed-in Lifetime Lubrication
- Overload Protection
- Fully Enclosed Components
- Lowest Headroom
- "CM-Alloy" Flexible Link Chain

WRITE US
or call your CM distributor for literature, prices and quick delivery from stock.

CM HOISTS AND CHAIN

CHISHOLM-MOORE HOIST DIVISION
Columbus-McKinnon Chain Corporation
Tonawanda, New York
Regional Offices: New York • Chicago • Cleveland
In Canada:
McKinnon Columbus Chain Ltd., St. Catharines, Ont.

Circle 652 on Inquiry Card—Page 209

Obituary

HARRY C. ORR, 64, foundry equipment sales engineer, C. O. Bartlett & Snow Co., Cleveland, died there Dec. 19. He joined the company in 1911 as a draftsman, later transferring to the foundry sales department, where in 1953 he became manager of the products and repair parts sales and service department.

HARRY C. ORR

Arthur H. Chappelka, 75, former vice president, Lake City Malleable Co., Cleveland, died Dec. 26. Associated with the former Chisholm & Moore Co., Cleveland, from 1902, he was vice president-operations there until 1928 when he assumed a similar position with Lake City Malleable Co., Cleveland. He retired in 1930 and 17 years ago moved from Willoughby, O., to Stuart, Fla., where he made his home.

Garland T. Thayer, 92, owner, Thayer Foundry & Supply Co., Charleston, W. Va., died Dec. 5. He joined his father and uncle in the Thayer Machinery & Foundry Co. in 1882 and later owned and operated the Thayer foundry and the South Side Foundry & Machine Works, Charleston, until 1929. He was active in Thayer Foundry & Supply Co. until his death.

Albert E. White, 72, professor emeritus of mechanical engineering, University of Michigan and director emeritus of the university's Engineering Research Institute, died Dec. 18. Before becoming an instructor at Michigan in 1911, he was head of research on blast furnace byproducts at Jones & Laughlin Steel Co., Pittsburgh. Prof. White was the first president of the American Society for Metals and a former president of American Society for Testing Materials.

W. G. Mochrie, since 1955 managing director, Tyseley Metal Works Ltd., Birmingham, England, died Nov. 29. He joined the company in 1938 as a metallurgist, and later became London manager. A member of Institute of British Foundrymen since 1944, since 1949 he was honorary secretary of its London Branch. He was awarded the Meritorious Services Medal of IBF in 1954.

Vincent S. Caldwell, 57, former foundry foreman, Gluntz Brass & Aluminum Foundry Co., Cleveland, died Dec. 23, after an illness which forced his retirement two years ago. Mr. Caldwell was associated with the company for almost 40 years.

George C. Kohl, 62, from 1945 until he retired in 1955, chief permanent mold engineer, Aluminum Co. of America, Cleveland, died Dec. 16, in Fort Lauderdale, Fla. A graduate of Fenn College, he joined Alcoa in Cleveland in 1920.

Orvis T. Henkle, 85, a founder and former president, Mercury Mfg. Co., Chicago, died Dec. 17. He retired as board chairman of the electrical equipment company when it was acquired recently by Pettibone-Mulliken Corp., Chicago.

Carl T. Stripp, 79, former traffic manager, National Malleable & Steel Castings Co., Cleveland, died Jan. 12. He was associated with the company from 1918 to 1946, when he retired.

Francis T. Hartman, 50, foundry superintendent, American Malleable Castings Co., Marion, O., died Jan. 10. He spent 24 years with the company.

Roy A. Loder, chief inspector, Erie Malleable Iron Co., Erie, Pa., died Dec. 15, following a long illness. He was associated with the company since 1921.

Edward F. Henderson, 71, until his retirement in 1954 associated with the time study department, Ferro

FOSECO®

world-wide service eliminates foundry problems

For over twenty-four years FOSECO products and services have been helping foundrymen solve and eliminate foundry problems. Many specialized products have been developed by FOSECO laboratories, all of which have played a major part in the growth and advancement of the foundry trade. Wherever metals are melted and cast, in foundries and refineries all over the world, FOSECO products are available. There is a FOSECO product for every foundry need and for every type of metal.

here are a few typical FOSECO *products:*

- **FOR ALUMINUM ALLOYS —**

  Coverals — Covering and protecting fluxes for aluminum alloys.

  Degasers and Nucleants — For removal of harmful gases from aluminum melts and for refining grain size of the metal. Grades giving separate degassing, grain refining or a combined action are available.

- **FOR COPPER BASE ALLOYS —**

  Cuprits — Covering and protecting fluxes for use on copper and yellow brasses.

  Cuprex — Covering, cleansing and degassing compounds for red brasses and nickel alloys.

  Albrals — For removing oxide and other inclusions from high tensile brasses.

  Regenerators — For cleaning and degassing copper and nickel alloys.

  Deoxidizing Tubes — For deoxidizing and increasing the fluidity of copper and nickel alloys.

- **EXOTHERMIC FEEDING COMPOUNDS FOR ALL METALS —**

  Feedex — A range of moldable exothermic compounds (covered by U. S. Patent No. 2,591,105) which greatly reduce the riser volume, and increase casting yield. Also helps correct unfavorable temperature gradients and insures progressive solidification of the casting or ingot. Grades are available for all metals and alloys.

  Ferrux and Feedol — A complete range of riser covering compounds for ferrous and nonferrous alloys. Both insulating and exothermic, these compounds give increased efficiency to conventional type risers and permit some reduction in riser height.

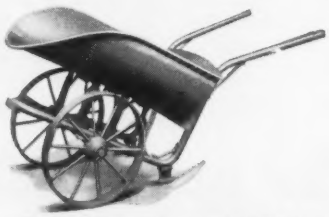
FOSECO® There are over 150 FOSECO products, covering every phase of foundry work, available in nearly every country in the world. FOSECO Technical Representatives cover almost forty countries, ready to give expert advice and assistance in foundry practice. Complete manufacturing plants are located in the United States, Canada, England, France, Germany, Italy, Austria, and South Africa. The American plant is now at a new, more central location in Columbus, Ohio, and representatives serving the entire nation are always available to help you solve your foundry problems. The Canadian plant is located in Guelph, Ontario.

FOUNDRY SERVICES, INC.
2000 Bruck Street, Columbus 7, Ohio

Circle 653 on Inquiry Card—Page 209

FORWARD DUMP BARROWS for FOUNDRIES

No. 102-A Barrow. Single steel wheel with 2" face, 16" diameter and 12 spokes.



No. 113-A Barrow. Two steel wheels with 2" face, 18" diameter and 10 spokes.

Here are two well-balanced charging Wheelbarrows for heavy duty foundry service. Handle loads up to 1000 lbs. Sturdy, welded, all-steel construction. Single wheel or double wheel. Available with zero pressure cushion type wheels or 4 ply pneumatic tired wheels with roller bearings. Immediate shipment.

Write for Circular No. 58.

Sterling FOUNDRY EQUIPMENT

STERLING WHEELBARROW COMPANY • MILWAUKEE 14, WIS., U. S. A.

Circle 654 on Inquiry Card—Page 209 A 5792-1/6

GOT MELTING PROBLEMS?

Solutions to gray iron foundry problems often come easier to outside consultants. To get expert help, call a Semet-Solvay metallurgist . . . he's a practical foundryman whose job it is to help you.

The high uniform quality of Semet-Solvay Foundry Coke plus expert help from our metallurgist will solve your cupola problems.

SEMET-SOLVAY DIVISION

Allied Chemical & Dye Corporation

40 Rector Street — *New York 6, N. Y.*

Buffalo • Cincinnati — Cleveland • Detroit

In Canada: SEMET-SOLVAY COMPANY, LTD., Toronto

Western Distributor: WILSON & GEO. MEYER & CO., San Francisco

For Better Melting

Machine & Foundry Inc., Cleveland, died Dec. 14. He was associated with the company more than 20 years.

Leroy J. Ackermann, 37, eastern representative, Lindberg-Fisher Division, Lindberg Engineering Co., Chicago, died Dec. 11, in Baltimore.

Harry B. Klar, for over 30 years Buffalo representative of Osborn Mfg. Co., Cleveland, died Dec. 17. He retired about a year ago.

Clyde A. Heisler, president, A. C. Williams Co., Ravenna, O., died Dec. 20.

Predicts Record Sales of Investment Castings in 1957

Sales of investment castings during 1957 may reach a volume of $175 million and even could top $200 million. That prediction has been made by K. W. Thompson, president, K. W. Thompson Tool Co., New York, and newly elected president of the Investment Casting Institute.

"Even at the more modest figure," he stated, "such a sales volume would show a 20-per-cent increase over total estimated 1956 sales of $148 million and nearly a 100-per-cent increase over the 1953 volume of $96 million." Mr. Thompson indicated that increased sales should come from both present users of investment castings and from increasingly larger numbers of new users.

A survey of growth and expansion plans in the industry shows that more than half the companies in the field have specific plans for expansions of facilities and enlarged numbers of employees. Industry facilities are expected to increase about 27 per cent in terms of square feet of plant space during 1957. Employees will increase 21 per cent and number of plants 9 per cent.

Book Review

Symposium on Metallic Materials for Service at Temperatures Above 1600°F, paper, 200 pages, 6 x 9 in., published by the American Society for Testing Materials, 1916 Race St., Philadelphia 3. Price $3.50.

Consisting of 13 papers, this symposium attempts to provide a basis of evaluation of a number of metallic materials, including cermets, which have been undergoing study in laboratories to determine their suitability for higher temperature service. The papers discuss such properties as physical, chemical and mechanical as well as methods of combating surface deterioration caused by temperature.

Circle 655 on Inquiry Card—Page 209

Circle 656 on Inquiry Card→

STERLING'S NEW

"STERDENSE"

GRINDING WHEEL FOR FOUNDRY SNAGGING

PROVIDES AN UNUSUAL COMBINATION OF NEWLY DEVELOPED INGREDIENTS TO OBTAIN A SUPERIOR FOUNDRY GRINDING WHEEL FOR SWING FRAME AND FLOOR STAND SNAGGING.

BIG NEWS!

Sterdense now available for foundry use! Sterling's intensive research has now developed the Sterdense Grinding Wheel for snagging operations in foundries.

The same astounding results enjoyed by steel mill users are now available for casting snagging operations. Reports show

Sterling's New Sterdense Grinding Wheel is now available for all types of foundry snagging operations in addition to its fine performance in steel mill slab and billet departments. Special specifications, recently introduced, provide as great efficiency and economy for the grinding of castings as has been evident wherever other types of heavy pressure problems have been solved.

Based upon an idea that a tool, firmly held, will do a better and faster job, this new grinding wheel has a special, compact bond to hold the sharp, abrasive grains firmly and rigidly until all their cutting action has been used. As a result, Sterling's New Sterdense Wheel offers more metal removal per minute and, at the same time, provides a cooler-grinding, longer-lasting abrasive unit for foundry snagging.

The enthusiastic acceptance of Sterdense by foundry operators everywhere suggests its application to your snagging assignments. Sterling abrasive engineers, skilled in applying Sterdense to unusual demands for lower cost and superior cutting action, will welcome your inquiry. Write or wire us today.

STERLING

"THE WHEELS OF INDUSTRY" STERLING

GRINDING WHEELS

STERLING GRINDING WHEEL CO., TIFFIN, OHIO—SUBSIDIARY OF ABRASIVE AND METAL PRODUCTS COMPANY

Foundry Developments

By EDWIN BREMER
Metallurgical Editor

INVESTIGATION of the "Influence of Hydrogen in the Titanium-CO_2 Process" by Dawson, Bach, and Smith as reported in the June, 1956, issue of the *Journal of Research and Development* (Birmingham, England) indicates that addition of titanium alone to molten gray iron with a low-hydrogen content and balanced sulphur content will result in undercooled graphite structures. When hydrogen content is high, addition of up to 0.3 per cent titanium will not form undercooled graphite. Bubbling CO_2 through high-hydrogen melts will remove that element to a point where titanium addition will form undercooled graphite. Unbalanced sulphur contents prevent formation of undercooled graphite by titanium.

Remote Control

IN the development of alloys which will withstand increased radiation exposure in atomic plants, studies are made of the microstructure of materials exposed to chain-reaction bombardment at the Hanford plutonium plant. Because the pieces to be examined are ray emitters, preparation of specimens for microscopic examination and the examination itself is conducted by remote control inside a 38-ton steel cell housing the radioactive sample.

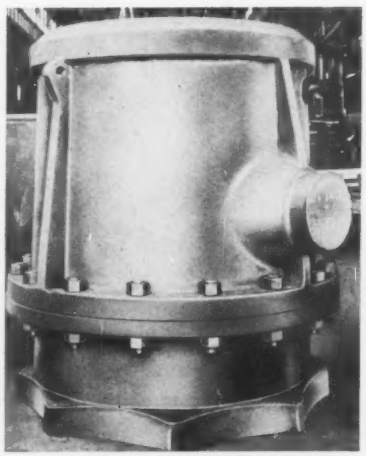
Mechanical hands, powered by electric motors and controlled from outside the cell, remove the sample from a lead container, position it against grinding and polishing wheels, and place it in an electrolytic etching bath. Fingers on the mechanical hand place the prepared sample on the stage of the microscope located within the cell, and focus the microscope. Image from the microscope is projected through a hole in the cell to an external eyepiece where it is examined by the observer without any danger.

Ultrasonic Standards

ULTRASONICS is a dependable tool for inspection of mechanical equipment, welds, etc. This was indicated through numerous examples cited by Frank C. Parker, Carbide & Chemicals Co., Union Carbide & Carbon Corp., in speaking before the recent annual meeting of the ASME. Lack of actual acceptance standards, however, causes difficulties for both the manufacturer and buyer of mechanical equipment, and development of suitable standards should be studied, he said.

Feeds Steel Ingot

ACCOMPANYING illustration shows what is believed to be the world's largest hot-top casing. It was produced by Kutztown Foundry & Machine Corp., Kutztown, Pa., for the Ferro Engineering Co., Cleveland. This hot-top casing, made of gray iron, is to be used to form a molten metal reservoir on the top of an ingot mold measuring approximately 5 ft in diameter and 10 ft high. The resulting steel ingot will weigh 110,990 lb. The hot-top casing weighs about 14,000 lb and has a mean inside diameter of 53⅞ in. Outside diameter of the bolting flange is 70½ in., and the over-all height is 79 in.



Resists Corrosion

NEW high-strength cast alloy for corrosion-resistant applications has been developed as a result of its research program at Ohio State University, according to the Alloy Casting Institute. Designated as type CD-4MCu, the alloy contains 25 to 27 per cent Cr, 4.75 to 6.00 per cent Ni, 0.04 per cent max C, 1.75 to 2.25 per cent Mo, 2.75 to 3.25 per cent Cu, and 1 per cent max Si and Mn. Alloy is reported to have corrosion-resistant properties equal to or better than 18-8 stainless. At a hardness of 300 brinell it has a tensile strength of 140,000 psi, a yield point of 100,000 psi, an elongation of 25 per cent, and a reduction of area of 37.9 per cent. Alloy is said to have better machinability than 18-8 stainless, good welding and grinding characteristics and good foundry characteristics.

Tends to Crack

IN a study of the "Effect of High and Low Temperatures on the Notched-bar Characteristics of a Cast, High-tensile, Beta-brass" by Bailey, McDonald and Samuels, as reported in the September, 1956, issue of the *Journal of the Institute of Metals* (London), the alloy was tested over a range of temperatures. Containing 61.24 Cu, 29.93 Zn, 5.04 Al, 1.34 Fe, 2.07 Mn and 0.15 Ni, with a tensile strength of 109,760 psi, the Charpy figure of the alloy at room temperature was 28.5 ft lb, decreasing to 11 ft lb at minus 195°C.

Fractures were transcrystalline at room temperature although there was a small but significant tendency to intercrystalline cracking at room temperature which disappeared gradually as the temperature was lowered. Tendency to intercrystalline cracking was emphasized somewhat at 100°C, and between 200 and 650°C a brittle range with intercrystalline fractures was revealed; the alloy became plastic at more elevated temperatures. Water quenching after heating at 500°C was apt to raise the impact resistance at room and subzero temperatures, while quenching from 750°C distinctly increased the intercrystalline weakness at room temperature and 100°C; this tendency also was apparent at minus 195°C.

Microstructure consisted of beta grains with the iron-bearing constituents dispersed within the grains and apparently in smaller form at the boundaries. Effect of heating above 550°C was gradually to dissolve this constituent. There was no evidence that the intergranular constituent was the cause of the intercrystalline weakness.

Circle 657 on Inquiry Card→

435 BATCHES A DAY... EVERY DAY!

a vital segment of a foundry depends on this "60A" Speedmullor for all of its molding sand

When the chips are down and real dependability is required . . . when an entire foundry depends on a single mullor . . . there's no other mixer that mulls hour after hour and shift after shift like the Speedmullor.

The three-shift operation of a Model "60A" Speedmullor at General Electric, Elmira is just one example. There, 435 batches of closely controlled, synthetic all-purpose sand are mulled to maximum physical properties daily. Batch size is 1200 pounds and the total time cycle for complete mulling is 90 seconds. This "60A" is just one of the Speedmullors used in the foundries of General Electric at Elmira.

If you, too, need dependability and capacity, write now for Bulletin No. 1220 . . . it will give you full information.

THE WORLD'S LARGEST EXCLUSIVE MANUFACTURER OF FOUNDRY MACHINERY

WOODEN CORE BOXES!

METAL CORE BOXES!

METAL-REINFORCED CORE BOXES!

VERTICALLY-SPLIT BOXES!

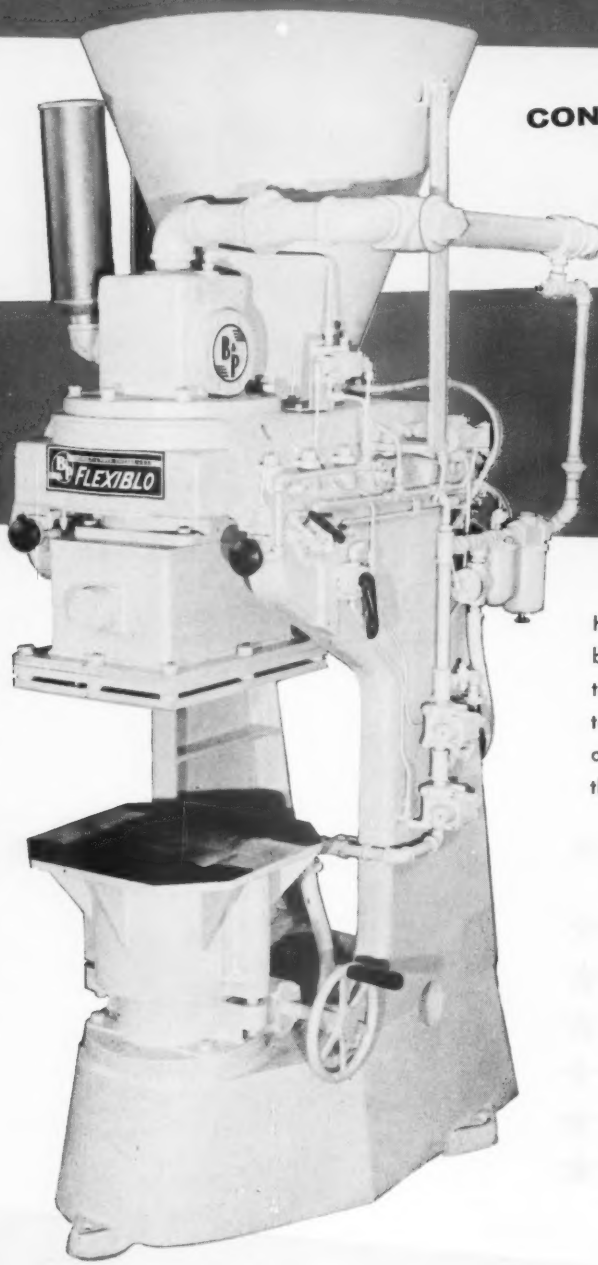
HORIZONTALLY-SPLIT BOXES!

OPEN BOXES!

CONVENTIONAL CORE SANDS!

HIGH STRENGTH CORE SANDS!

MOLDING SANDS!



all blown on the CB12C FLEXIBLO *with Agitator*

Here's the new standard of the industry in medium size core blowers. The new CB12C Flexiblo *with agitator* handles the toughest core sand with ease . . . blows all types of core boxes too. Even well designed wooden core boxes can be handled on the Flexiblo. Look at some of the CB12C's features and then send for Bulletin No. 5010 for full information.

Dependable Flexiblo air-economy . . . minimum air consumption

Full 30 pound blown core capacity

Completely-automatic push-button controlled cycle

Rugged cast steel frame—strongest in the industry

Air-on-oil, automatic side clamp unit

Full 6½-inch, adjustable draw

Full 12 x 20 inch sand magazine

LOOK TO
BEARDSLEY & PIPER
FOR BETTER METHODS

MEMBER FEMA

THE WORLD'S LARGEST EXCLUSIVE MANUFACTURER OF FOUNDRY MACHINERY

Around the Country

NEWS REPORTS FROM

Chicago . . . Pittsburgh . . . Philadelphia

Pittsburgh— Suppliers of castings to the automotive and steel industries are making encouraging predictions about 1957 sales. After a year-end lull in foundry activity, demand for castings rose quickly in January.

Automakers' demand for equipment is heavier than a year ago, some foundries report, and the electrical equipment and steel industries are also mapping expansion plans.

Another industry with encouraging expansion plans is clay manufacturing. Leading producers in the Pittsburgh area have placed large orders for equipment.

Despite brisk demand for castings from these industries, foundrymen are cautious about building their own capacity. Equipment suppliers to Pittsburgh foundrymen report sales are slack. Although inquiries are heavy, foundrymen appear to be waiting until business conditions in 1957 become clearer before ordering equipment.

Philadelphia— Casting demand has picked up rather slowly since the holidays. Most gray iron shops are operating five days a week, but with limited working forces in various instances, and in general it is pretty much touch-and-go. Backlogs range from one to four weeks.

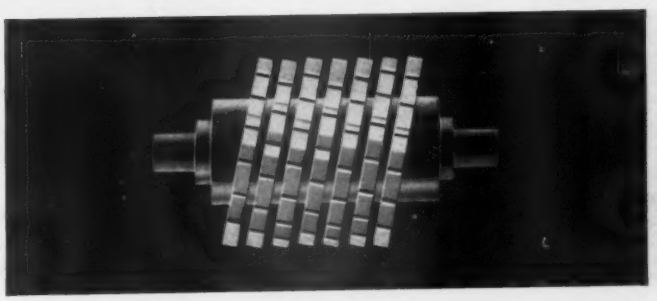
Steel and malleable shops continue to operate on a better basis than the gray iron foundries. Their schedules are tighter and backlogs more extended. Most steel foundries have little to offer under six or seven weeks. Malleable shops are booked fully a month ahead and in some cases beyond. Business with the brass and bronze shops continues in the doldrums; nor are the light metal shops doing too well, with aircraft needs off considerably from a few months ago, it is said.

Steel mill expansion is doing much to sustain business in steel castings; and in malleable, pipe fittings and builders hardware needs predominate. However, no little malleable production is believed to be going into inventory, which may backfire on operations later.

A bright spot in gray iron is an improvement in automotive die work; also material handling needs are holding up well. Gray iron shops specializing in castings for highway and other heavy construction are doing all right. Pressure pipe people are operating at a moderately good

ANGLE

for heavy-duty dressing

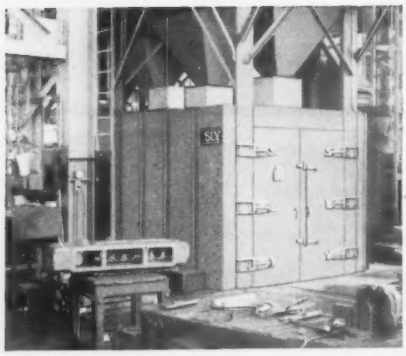


Desmond's Heavy Duty Dresser makes quick work of truing large, high speed rubber- or resinoid-bonded grinding wheels. Shears and picks at same time with patented angle-set Desmond-Huntington cutters. Dust-shielded ball bearings guarantee lasting precision. Cutters easily replaceable without adjusting bearings. Ask your Desmond distributor how proper dressing can make your grinding wheels serve better—longer.

THE ONLY COMPLETE LINE OF GRINDING WHEEL DRESSERS AND CUTTERS

Desmond

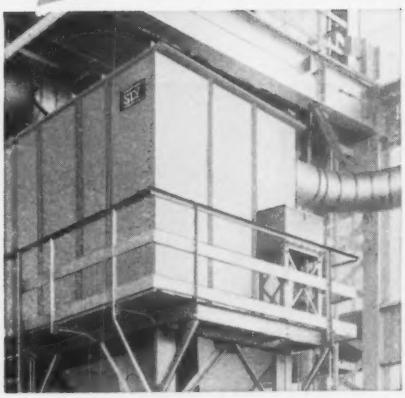
THE DESMOND-STEPHAN MFG. CO., URBANA, OHIO



BLAST ROOMS
for Complete Cleaning

Product surfaces must be clean to insure good results the *first* time. Sly — builder of blast rooms for 50 years — has the know-how to insure the right blast room for every job. Tough and rugged . . . the operators' choice because they are engineered to insure proper ventilation. Built in all types and sizes. Completely automatic abrasive handling systems.

SLY FOR SAVINGS
DOWN THE LINE



DUST FILTERS
for Dust-Free Efficiency

World-famous Sly Dust Filters insure 99.9% plus efficiency on all types of dust-collecting jobs; in foundries, machine shops, chemical plants, cement mills, etc. A complete range for either continuous or intermittent operation.

CORE OVENS
for Cost-Cutting Baking

Sly Ovens bake cores evenly . . . produce stronger, better cores with less scrap. Users report *two to three times more production.* Efficient air distribution, uniform temperature and correct exhaust assure consistently excellent results.

Write for Complete Information

Designers and Manufacturers of: Dust Control Systems, Industrial Ovens, Blast Cleaning Equipment, Tumbling Mills.

SINCE 1874 SLY

THE W. W. SLY MANUFACTURING CO.

4753 TRAIN AVENUE • CLEVELAND 1, OHIO

OFFICES IN PRINCIPAL CITIES

rate, but currently most of this tonnage is going into inventory. Jobbers are suffering most at this time.

In nonferrous castings, captive shops engaged in maritime work and industrial pumps and valves are doing very well, but little of this work is overflowing to the independent shops. Meter business is none too brisk, reflecting a lag in residential construction, which is accounting also for a rather spotty situation in plumbing supplies. This is admittedly off-season in light building work, however, and there are prospects for improvement by spring.

Chicago—In December this column warned that Chicago foundries would want to be on the alert for impending changes in zoning laws. Public hearings were about to be held on a new draft of the ordinance which supposedly would incorporate revisions in line with criticism which had been made last spring when hearings were held.

When the zoning amendment was published recently, it became known that few of the recommendations had been included; consequently at the public hearing on Dec. 19 severe attacks were leveled at the ordinance by the steel and paint industries whose spokesmen contended that performance standards on smoke, noise, odors and vibrations, are impossible and unrealistic. They warned that they would be forced to move out of the city for further expansion if the ordinance is passed and enforced.

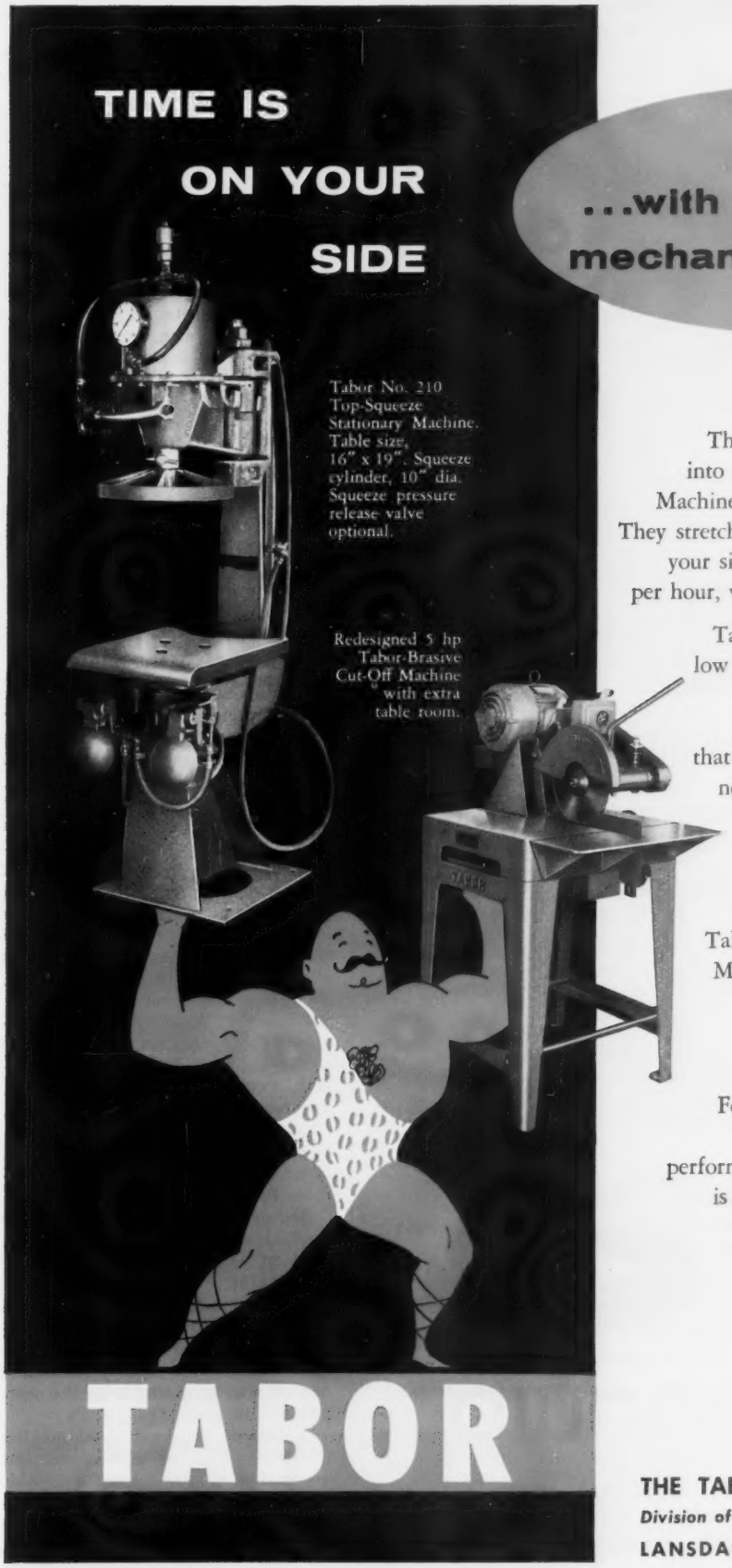
Because of the protests, city council delayed adoption of the ordinance until a newly appointed industry advisory council can make recommendations on changes that should be made. The council is headed by Edward C. Logelin, vice president, United States Steel Corp. So far, unfortunately, only a handful of foundries or companies which have foundry departments have attended hearings or been vocal in urging changes in the proposed legislation.

* * *

The Michigan avenue bridge over the Chicago River will undergo extensive repairs this spring. Broad steel girders forming the counterweight boxes that balance the north and south bridge leaves in the 35-year old structure are badly corroded.

The counterweight boxes are filled with concrete which absorbs water. This concrete will be retained but some additional counterweighting needed to the extent of 200 tons will be provided by 900 cast iron blocks of 1-foot cube. This iron, already purchased, is the equivalent of sash

TIME IS ON YOUR SIDE



Tabor No. 210 Top-Squeeze Stationary Machine. Table size, 16" x 19". Squeeze cylinder, 10" dia. Squeeze pressure release valve optional.

Redesigned 5 hp Tabor-Brasive Cut-Off Machine with extra table room.

TABOR

...with TABOR mechanized muscles

The new mechanized muscles built into every Tabor Molding or Cut-Off Machine mean time and money to you. They stretch production by putting time on your side . . . giving you more castings per hour, with less downtime per machine.

Tabor Molding Machines combine low first cost with ease and speed of operation, and low maintenance year-in and year-out. Scrap losses that used to be taken for granted can now be reduced. Perfect alignment between yoke and squeeze head prevents mismatches and saves metal. The completely shockless full-power jolt of the Tabor Power-Rollover Power-Draw Machine puts an end to jar-caused maintenance, not only to the machine itself but also to surrounding equipment.

For the production foundry where mechanization is the answer to performance problems, the man to see is the Tabor Man. Call him today, or write for detailed data.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

THE TABOR MANUFACTURING CO.
Division of Turbo Machine Company
LANSDALE, PA.

Foundries Find Aeroquip Flexible Hose Lines Resist Heat, Vibration and Abrasion

ALBION MALLEABLE IRON COMPANY USES AEROQUIP ON MANY TYPES OF FOUNDRY EQUIPMENT

Albion Malleable Iron Company, Albion, Michigan, has long relied on the dependability and money-saving advantages of Aeroquip Hose and Reusable Fittings for hydraulic and other fluid lines on coremaking, molding, melting, heat-treating and finishing equipment.

Finishing Superintendent Ernie Sandelius says, "Aeroquip Hose is well suited to foundry applications because it resists abrasion, vibration, heat and other operating stresses better than anything we've used."

For full information on tough, long-lasting Aeroquip Hose Lines, call the Aeroquip Distributor listed in your Yellow Page Phone Book, or write us.

Aeroquip Hose Lines for foundry applications: **1525 or 2556 Hose** for air, water, oil lines up to 250 psi.; **1503 or 2651 Hose** for hydraulic, lube oil, fuel, air, water lines up to 3000 psi.; **1509 Hose** for hydraulic, air lines up to 4500 psi.; **1546 Hose** for fire-resistant hydraulic fluid lines up to 4500 psi.

Aeroquip

REG. TRADEMARK

AEROQUIP CORPORATION, JACKSON, MICHIGAN

IN CANADA: AEROQUIP (CANADA) LTD., TORONTO 15, ONTARIO
LOCAL REPRESENTATIVES IN PRINCIPAL CITIES IN U. S. A. AND ABROAD
AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U. S. A. AND ABROAD

weight iron analysis in composition.

An interesting feature of the repair is that the bridge will be split lengthwise to keep one half at a time open to traffic.

A new Dearborn street bridge, now in the design stage, will have counterweight boxes filled with cast iron blocks, instead of concrete, to eliminate corrosion.

* * *

Gray iron and malleable foundries which melt by cupola were notified of higher coke prices early in January. In most instances, the advance was $1 a ton, although at St. Paul the oven price was boosted $1.25 a ton. By virtue of a favorable freight rate from St. Paul to Chicago of $3.39, foundry coke from the former city carries a Chicago delivered price of $33.14. All other area coke producers meet this price in Chicago through freight absorption. Last August, following end of the steel strike, coke price was raised $2 a ton.

First Penn State Conference To Treat Practical Subjects

A program designed principally for the operating foundryman is being prepared for the first Penn State Foundry Conference. It will be held at Pennsylvania State University, June 20-22, under the sponsorship of the university, ten eastern chapters of the American Foundrymen's Society and three independent foundry associations.

Speakers and discussion leaders have been selected from men well qualified to treat the practical phases of gray iron, malleable iron, steel, nonferrous and sand practices.

William B. Wallis, Lectromelt Furnace Co., Pittsburgh, is conference chairman, with Kenneth L. Holderman, Pennsylvania State University, honorary chairman. C. W. Mooney, Olney Foundry, Link-Belt Co., Philadelphia, is vice chairman, and E. J. Biller, Vulcan Mold & Iron Co., Latrobe, Pa., is program chairman.

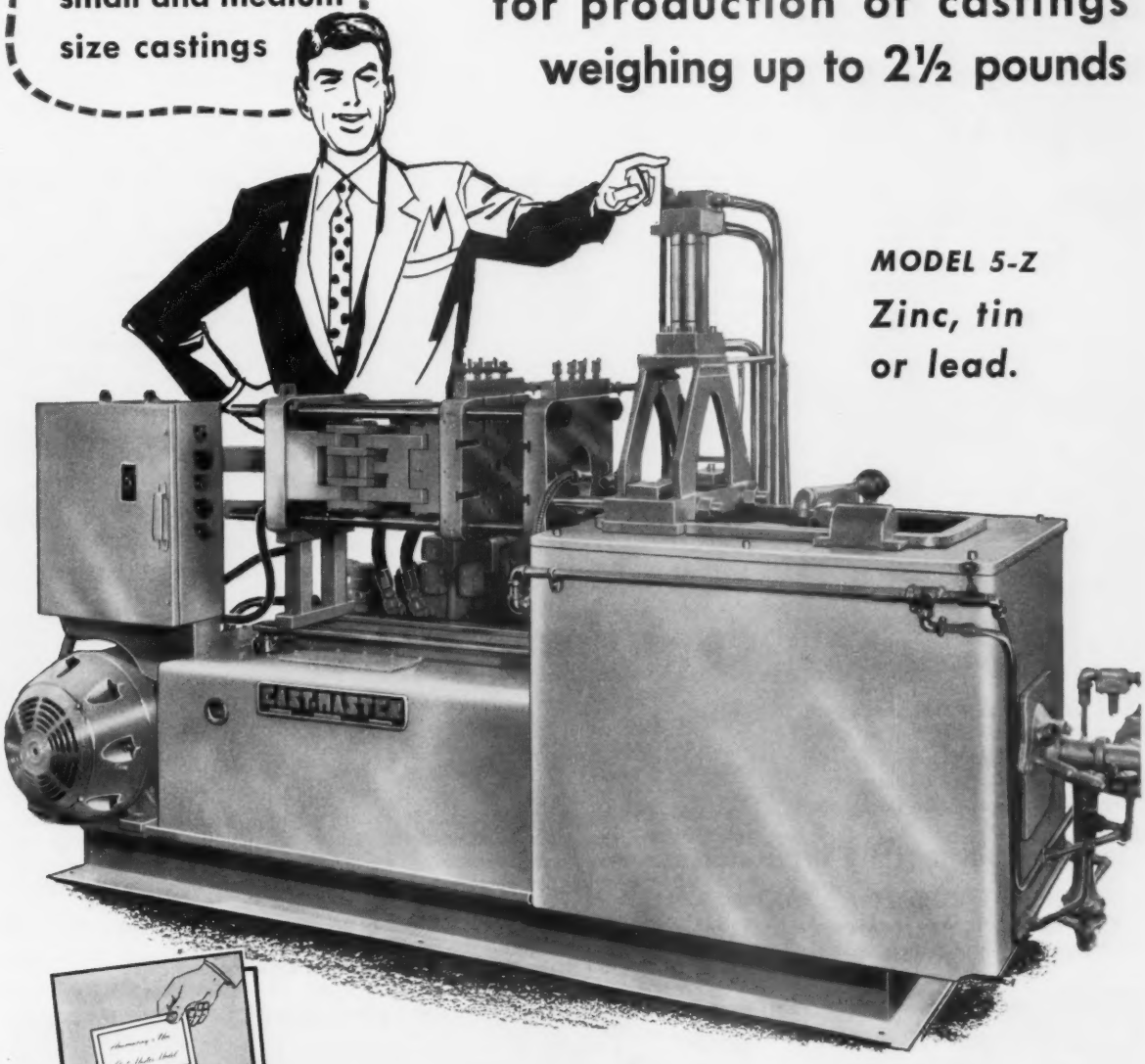
Registration for the three-day meeting will start Thursday morning, June 20, at the Hetzel Union Building on the Penn State campus. A charge of $15 for the conference will cover the registration fee, instructional materials, two banquets and one luncheon. Various housing accommodations will be available on the campus and in State College, Pa.

Additional information concerning the conference and accommodations are available from T. Reed Ferguson, Extension Conference Center, Pennsylvania State University, University Park, Pa.

Here's a natural for shops doing small and medium size castings

The MIGHTY MIDGET

for production of castings weighing up to 2½ pounds



MODEL 5-Z

Zinc, tin or lead.

SEND FOR ILLUSTRATED BROCHURE WITH COMPLETE SPECIFICATIONS

Yes, the new Cast-Master Model 5Z is a natural for any die casting shop which specializes in small and medium size work, or as a supplementary machine for handling small dies. The Model 5Z embodies many of the exclusive efficiency-producing features of the larger Cast-Master models, and is capable of producing mirror smooth, hardware finish castings at a high rate of speed. Write today for specifications and complete information.

EASTERN REPRESENTATIVE: *Milton Harmon, 18 Rock Rd., Milford, Connecticut*

CAST-MASTER *Inc.*

23901 AURORA ROAD
BEDFORD, OHIO

Investment Casting Foundry

Specializes in Ferrous Castings

By THOMAS A. DICKINSON

Polystyrene pattern for complex rotor casting served purpose of a wax pattern and saved thousands of dollars in making an experimental part. Note wax patterns in the background

STEEL investment castings weighing up to 15 lb apiece now are being produced efficiently in the Howard Foundry Co. plant at Los Angeles, in quantities averaging about 32,000 lb per month. In addition, the foundry's 140 workers produce over 100,000 lb of sand-cast ferrous castings every 30 days.

Although it was established approximately ten years ago for the primary purpose of serving the western aircraft industry, the 450,000-sq-ft plant produces no nonferrous castings.

In the manufacture of ferrous investment castings, the Los Angeles plant is able to produce relatively large and complicated articles economically in quantities ranging from one to several thousand identical pieces.

By using polystyrene patterns in place of die-cast wax-patterns, for example, the plant has saved thousands of dollars for customers who required a single experimental casting.

Polystyrene plastics are among the few materials that melt and burn like waxes, yet have room-temperature physical properties that permit their precision fabrication with lathes and related machine tools. Because of their cost as raw materials, such plastics cannot be used as economically as waxes where many duplicate castings are required; but one polystyrene pattern can be made for much less than the cost of the die that would be needed to mold a comparable wax pattern.

For instance, the polystyrene pattern shown in an accompanying photograph recently enabled the plant to produce one large experimental casting at a total cost of only $450. An aluminum die worth about $15,000 would have been required to make an equivalent wax pattern for the same job.

Because of the performance of polystyrene at elevated temperatures, Howard officials say that their plastic and wax patterns can be used to make investment molds without processing variations.

Patterns for the production of identical investment castings are molded with a battery of six injection presses from four different wax compounds to obtain appropriate shrinkage allowances for different types of steel. Mistakes in use of the wax prepara-

Injection press operator readies die for molding of wax pattern material

Women are assembling wax pattern and sprue components

HOW TO INCREASE PRODUCTION IN YOUR *CLEANING ROOM...*

Macklin manufactures a complete line of foundry "Wheels of Profit", each designed to speed production in your cleaning room.

Don't let your cleaning room be a bottle neck to expanded foundry production! Specify Macklin Foundry Wheels with the improved B-5 bond. Tests prove the B-5 gives up to 30% longer wheel life. It cuts faster and the wheels stay sharp with a minimum of dressing.

HERE'S PROOF OF PERFORMANCE—

OPERATION: Stainless and high-speed steel billets and ingots. (Swing frame, 20 x 2½ x 6")

	Wheel Life	Stock Removal
Macklin	13¾ hrs.	330 lbs.
Wheel A	14 hrs.	220 lbs.

OPERATION: Malleable castings. (Floor stand, 20 x 2 x 10")

	Wheel Life	Stock Ground Over the Wheel
Macklin	24 hrs.	17 tons
Wheel B	18 hrs.	11 tons

OPERATION: 3% Titanium Steel Billets. (Swing frame, 16 x 2 x 6")

	Stock Removal
Macklin	36 lbs. per hr.
Wheel C	18 lbs. per hr.

OPERATION: Gray Iron Castings. (Portable, 6/4 x 2 x ⅛")

	Wheel Life
Macklin	17-20 hrs.
Wheel S	12-15 hrs.

CHECK-UP ON THE GRINDING WHEEL PERFORMANCE IN YOUR FOUNDRY

- **Is the rate of production up to your top requirements?**
- **Are wheels removing the proper amount of metal in relation to the amount of wheel used?**
- **Do wheels stay sharp and hold proper contour?**

YOUR MACKLIN FIELD ENGINEER WILL BE GLAD TO HELP YOU GET THE RIGHT ANSWERS TO THESE QUESTIONS. **To arrange for an on-the-job demonstration, *without obligation*, write today!**

MACKLIN company

Dept. 22, Jackson, Michigan

Circle 663 on Inquiry Card—Page 209

During primary investment of a wax pattern, it is dipped into a slurry containing fine ceramic particles

Paper-lined stainless steel flask is positioned over a mounted pattern

tions are eliminated by incorporating a different pigment in each of the four materials. Each then can be distinguished readily by its color.

To facilitate the production of castings with odd internal configurations, the plant now uses a wax compound which can be dissolved in water for coring-out purposes. Recent tests have indicated, however, that a new type of ceramic core material may serve the same purpose for less money.

Besides maintaining appropriate wax temperatures and injection pressures, the six automatic patternmaking presses have facilities for the hydraulic locking of die components.

Women perform most molding and assembly operations essential to the fabrication of wax patterns. Experience has shown that men lack the ability to adapt themselves to work of such a light and delicate nature.

Sprues for wax patterns are formed in gypsum molds. Cavities are greased before they are locked together, to avoid adhesion of the wax, which is heated in 25-gal tanks.

Sprue and pattern components are assembled at long tables in the usual manner, then carefully inspected and transferred to a primary investment department where they are dipped in a slurry made by mechanically dispersing fine ceramic particles in water. The dip coating provides an exceedingly smooth cavity surface, despite the subsequent coating of relatively coarse ceramic material.

Patterns next are mounted on bottom boards, each of which has a heavy coating of wax to permit bonding thereon of a pattern and a preformed stainless steel flask. Paper liners are used to permit investment of a secondary slurry above upper edges of flasks.

The secondary slurry is made by mixing coarse refractory particles with water and an organic binding medium in rubber-lined mechanical tumblers which resemble concrete mixers. Function of the organic binder is to bond the refractory particles until they can be fused or cured with heat.

After the secondary slurry is manually invested up to the upper edge of a given paper liner, the flask assembly containing the mix is placed on a vibrating table top to eject air bubbles and settle the slurry around details of the pattern. Paper and slurry remaining above the upper edges of the flask then are removed.

Flasks containing green molds are loaded on a roller conveyor which removes wax pattern materials from their cavities by passing them through an oven heated to 350°F. All wax thus removed actually isn't "lost." It's collected in pans beneath the oven for further use in making sprues.

Dewaxed molds usually are stored for days—and sometimes for weeks—before they are cured and used since they generally require little shelf space and do not deteriorate with age. Consequently, the plant is able to maintain a production melt schedule of optimum flexibility.

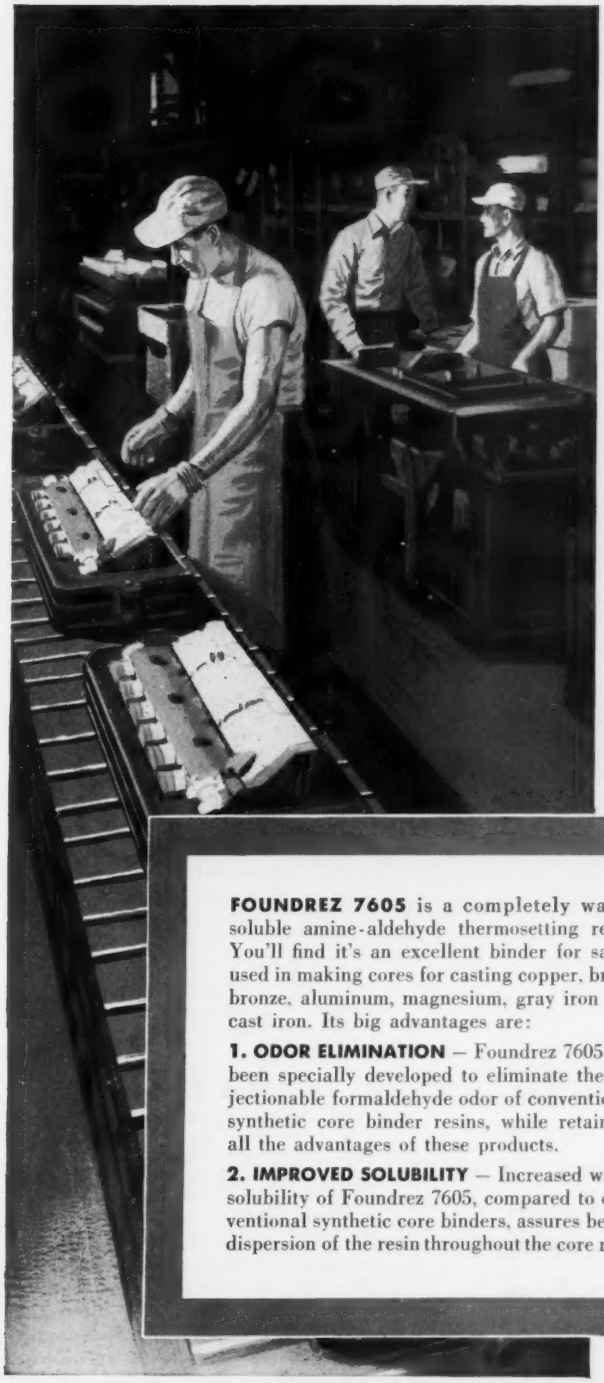
Molds are heated to 1800°F for 6 to 8 hours in eight curing furnaces to volatilize organic substances and fuse remaining refractory materials.

Each mold is taken from its curing furnace to one of three induction furnaces and filled with molten metal before it has a chance to cool. This procedure creates better feed and other conditions which facilitate pro-

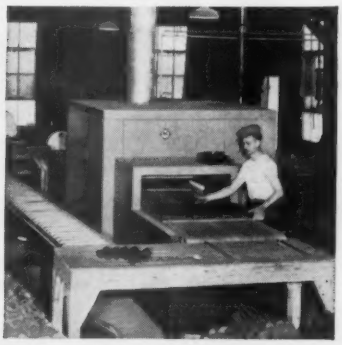
Secondary slurry is manually invested in flask containing wax pattern for a steel investment casting

Employees use a pyrometer to check condition of an induction furnace melt which is ready for pouring

"Foundrez 7605 gives you 4 big advantages"



Low operating cost — Cores made with RCI's Foundrez 7605 resin binder are baked *fast and economically* in this dielectric oven. The cost per ton of labor, materials and fuel is low . . . production rate high.



RCI offers new odorless core binder

FOUNDREZ 7605 is a completely water-soluble amine-aldehyde thermosetting resin. You'll find it's an excellent binder for sands used in making cores for casting copper, brass, bronze, aluminum, magnesium, gray iron and cast iron. Its big advantages are:

1. ODOR ELIMINATION — Foundrez 7605 has been specially developed to eliminate the objectionable formaldehyde odor of conventional synthetic core binder resins, while retaining all the advantages of these products.

2. IMPROVED SOLUBILITY — Increased water solubility of Foundrez 7605, compared to conventional synthetic core binders, assures better dispersion of the resin throughout the core mix.

3. FAST BAKING — You speed core production by cutting baking cycles with fast-drying Foundrez 7605 binder resin. You save on labor and fuel, too.

4. EXCELLENT COLLAPSIBILITY — Cores made with RCI Foundrez 7605 have collapsibility characteristics suited to a wide range of pouring temperatures.

Reichhold can deliver this new liquid resin to you in tank cars, tank trucks (or, at higher price, in non-returnable 55-gal. drums).

Write to RCI for *Technical Bulletin F-8* which gives typical mixes and performance data for Foundrez 7605 core binder.

Creative Chemistry . . .
Your Partner in Progress

RCI

REICHHOLD

Synthetic Resins • Chemical Colors • Industrial Adhesives • Plasticizers
Phenol • Formaldehyde • Glycerine • Phthalic Anhydride • Maleic Anhydride
Sodium Sulfite • Pentaerythritol • Pentachlorophenol • Sulfuric Acid

REICHHOLD CHEMICALS, INC., RCI BUILDING, WHITE PLAINS, N. Y.

Reduce Replacement Costs

with **Acme**

• DIE CAST POTS
• MELTING POTS
• INGOT MOLDS

Melting non-ferrous metals? You'll save with Acme melting pots and ingot molds. They require less frequent replacement because they're cast from a special iron formula that combines strength with the ability to withstand high temperatures. They improve production, too, because they're designed for even distribution of heat without hot spots. More than 30 years' experience in this field is your assurance of high quality in Acme melting pots and ingot molds . . . designed *by* foundrymen, *for* foundrymen.

Quick delivery anywhere in the United States.
Write for size list showing 40 standard sizes.

Acme FOUNDRY CO.

2502 22nd St. • DETROIT 16, MICH. • *Phone* TAshmoo 5-2404

duction of sound, dense, castings. The induction furnaces have 50, 200, and 650-lb capacities. They assure adequate quantities of metals with temperatures up to 3200° F for a wide variety of production runs. Carbon content of metal samples is tested prior to pouring operations.

Gravity pouring and filling methods now are used in making all investment castings in Howard's Los Angeles plant. Experience has shown that they enable the company to meet both aircraft and commercial quality requirements in virtually all instances.

Prior to the removal of gates with cutoff saws and grinding equipment, castings are inspected for quality with x-ray, Magnaflux, and Zyglo equipment as well as in the usual dimensional checking fixtures.

Despite intricate shapes, complex internal sections, unmachinable cavities, etc., castings are said to have over-all tolerances that range consistently from ±0.0030 to ±0.0080 in. per in. As-cast finishes average about 125 microinches, but company officials claim they can be held to 70 microinches if necessary.

AFS *Transactions* Published

Volume 64 of its *Transactions* has been published by the American Foundrymen's Society. The 730-page book incorporates proceedings of the society's 60th annual meeting, held at Atlantic City, N. J., May 3-9, 1956, including technical papers presented at that convention. In addition, the volume contains the annual report of the AFS general manager and treasurer and minutes of meetings of the board of directors, board of awards, nominating committee and finance committee.

Book Review

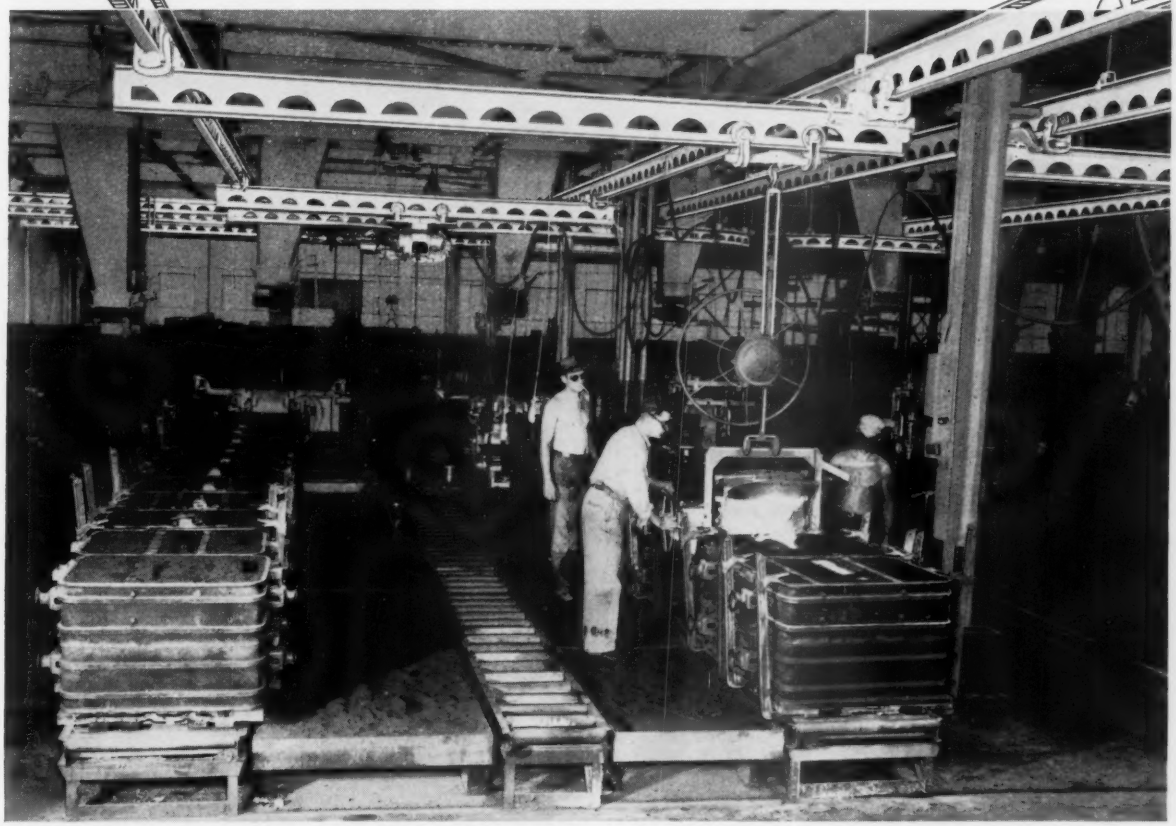
Atmospheric Pollution—Its Origins and Prevention by A. R. Meetham, cloth, 302 pages, 6 x 8½ in., published by Pergamon Press Inc., 122 East 55th St., New York 22, N. Y.

Revised edition of book published in 1952 includes considerable information developed since the first printing. It is intended for use to all who are professionally interested in atmospheric pollution. A selected, classified bibliography is included as a supplement to reference lists at the ends of chapters.

One chapter contains a realistic treatment of the lessons learned from the London smog disaster of 1952, a review of progress made against smoke and sulphur dioxide, notes on fumes from gasoline and fuel oil and a concise account of atomic energy as it is likely to affect the atmosphere.

EFFICIENT HANDLING at Landis Tool Company Since 1942

Pouring is expedited because large ladles of metal can be delivered directly from cupolas to molds on the overhead Tramrail. This speeds the operation and reduces metal heat loss. The Tramrail equipment is hand-propelled of one ton capacity with manual and power-driven hoists.



CLEVELAND TRAMRAIL a *Big Aid* in Foundry Production

EXCEPT for one bay devoted to very heavy castings, the entire modern foundry of Landis Tool Company, Waynesboro, Pa., is covered by a Cleveland Tramrail crane and track system. This has been a big factor in making the handling of the various foundry materials easier, faster and more efficient. It has played an important role in obtaining greatly reduced costs and improving safety.

Having been in continuous operation since 1942, the design and quality of the Tramrail equipment have been fully proven to Landis. Their foundry Superintendent reports that the equipment has been very satisfactory and maintenance extremely low.

WRITE FOR FREE COPY of Engineering and Data Booklet No. 2008. Packed with valuable information.

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 3843 E. 286 ST. • WICKLIFFE, OHIO

News Views

QUARTER CENTURY CLUB: Eight new members were welcomed recently into the Pangborn Corp.'s Quarter Century Club at the sixth annual reunion of the club. New members were presented with engraved gold wristwatches by Thomas W. Pangborn, chairman of the board. The honored initiates, front row, left to right, are A. Lesley Gardner, C. S. Bowers, L. H. Baker, A. F. Rodgers, C. H. McKinsey, J. R. Wagner, A. W. Shupp and Max E. Fahrney. Standing left to right at the head of the table are P. J. Potter, Victor F. Stine, Thomas W. Pangborn, Lloyd L. Stouffer, Mrs. Helen R. Fisher and Rev. DeWitt L. Miller.

ENDS LONG CAREER: Henry J. Hesby, second from right, the first employee hired by the founders of Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., more than 48 years ago, began his retirement recently and was honored by the company officials. Presenting Mr. Hesby with a gift and letter of commendation is R. L. Lindland, CWC president. Left to right are J. M. Schappert, director of industrial relations, Mr. Lindland, Harry Berkel, core room superintendent, Mr. Hesby and Harold Westbrook, plant superintendent.

PLANT EXPANSION: As part of a $5 million expansion program at Sandusky Foundry & Machine Co., Sandusky, O., melting capacity has been increased to 42,500 lb per heat. Ultimate melting capacity will reach 62,000 lb per heat with future installation of a large electric arc furnace. The foundry produces special rolls and mill products for the paper industry.

LIGHT ISN'T WASTED UP HERE

Stop paying for wasted light

SWITCH TO GENERAL ELECTRIC REFLECTOR LAMPS, GET MORE LIGHT—SAVE MONEY, TOO!

TO GET MORE LIGHT ON THE JOB . . . OVERNIGHT just switch to General Electric Reflector Lamps in your filament or mercury lamp systems. It's as easy as a twist of the wrist. The reflectors are sealed *inside* the bulbs where they can never get dirty. You get up to 78% more light on the work . . . where you want it. There's a size to fit your present system; no need to buy new fixtures or sockets.

YOU SAVE MAINTENANCE DOLLARS, TOO. You seldom if ever have to clean fixtures. Maintenance is reduced to changing burnouts—and the uniform life of General Electric Lamps makes it possible to change burnouts on a regular schedule.

CHOOSE FROM THESE FILAMENT REFLECTOR LAMPS. General Electric's 500- and 750-watt filament reflector lamps are available in standard or high voltage, and 1000-watt in standard voltage. Their sealed-in, pure silver reflectors never need cleaning.

CHOOSE FROM THESE MERCURY REFLECTOR LAMPS. (1) The General Electric RW-1 with white phosphor reflector is the newest, and gives you the most light at lowest cost in most areas. Also you get better, whiter light, than from any clear lamp. (2) The RC-1 with phosphor reflector gives you extra light (only 7% less than the RW-1) *and* color improvement, too. (3) The R-1 has a pure silver reflector; is best for extremely dirty areas.

RW-1

RC-15

And if you're now using 1000-watt Mercury Lamps, try the new *half*-phosphored G-E 1000-watt Mercury Reflector Lamps (either RC-15 or RC-12). All lamps are interchangeable with comparable clear lamps.

Your General Electric Lamp specialist will be glad to help you pick the best G-E Reflector Lamp for your plant. Contact him now—or write: General Electric Co., Large Lamp Dept., Nela Park, Cleveland 12, Ohio.

MORE LIGHT IS REFLECTED TO THE WORK AREA DOWN HERE

Progress Is Our Most Important Product

GENERAL ELECTRIC

Electric Furnace Conference

Breaks Attendance Record

By EDWIN BREMER
Metallurgical Editor

FOURTEENTH annual Electric Furnace Steel Conference attracted considerable interest and broke all previous records with nearly 1000 in attendance. Held at Hotel Morrison, Chicago, Dec. 5-7, the conference was sponsored by the Electric Furnace Steel Committee of the Iron and Steel Division, American Institute of Mining, Metallurgical and Petroleum Engineers Inc.

First day of the meeting was devoted to plant trips to South Chicago Works, Republic Steel Corp., Chicago, and Indiana Harbor Works, American Steel Foundries, East Chicago, Ind.

Second day's program included two joint technical sessions, with the annual dinner in the evening, and the third day was divided into separate technical sessions for the ingot and castings groups. At the dinner, with E. C. Loeglin Jr., U. S. Steel Corp., Chicago, presiding, E. R. Johnson, Republic Steel Corp., Cleveland, spoke on "Men, Money and Machines."

Newly elected chairman of the Electric Furnace Steel Executive Committee is D. L. Clark, Simonds Saw & Steel Co., Lockport, N. Y. Victor E. Zang, Unitcast Corp., Toledo, O., was elected chairman of the committee for the forthcoming 15th conference, and V. J. Nolan, National Carbon Co., New York was elected vice chairman.

Announcement was made that the 15th conference will be held at the Penn-Sheraton Hotel, Pittsburgh, Dec. 4-6, 1957 while the 16th will be held in Detroit in December, 1958.

Clarence W. Sims, Battelle Memorial Institute, Columbus, O., retiring chairman of the executive committee, was presented a permanent certificate of registration and a 400-day clock in recognition of long and faithful service since the inception of the conferences.

Opening technical session, with H. F. Walther, Timken Roller Bearing Corp., Canton, O., and E. H. Weak, Highland, Ind., presiding, pertained to a broad view of electric furnace steelmaking which was discussed in several papers. Robert Boutigny, Stein et Roubaix, Paris, France, gave an appraisal of European electric furnace melting in which he indicated that the field, as in the United States, is advancing and many new and larger electric furnaces are being installed to increase production of this type of steel.

In a paper **Fifty Years of Progress in Electric Arc Furnaces** Samuel Arnold III, Pittsburgh, stated that the first heat of steel melted in the arc furnace in this country was poured on April 5, 1906, at the Halcomb Steel Co., Syracuse, N. Y. Five years later on Nov. 15, 1911, the first heat of electric furnace steel exclusively for castings was poured at Treadwell Engineering Co., Easton, Pa.

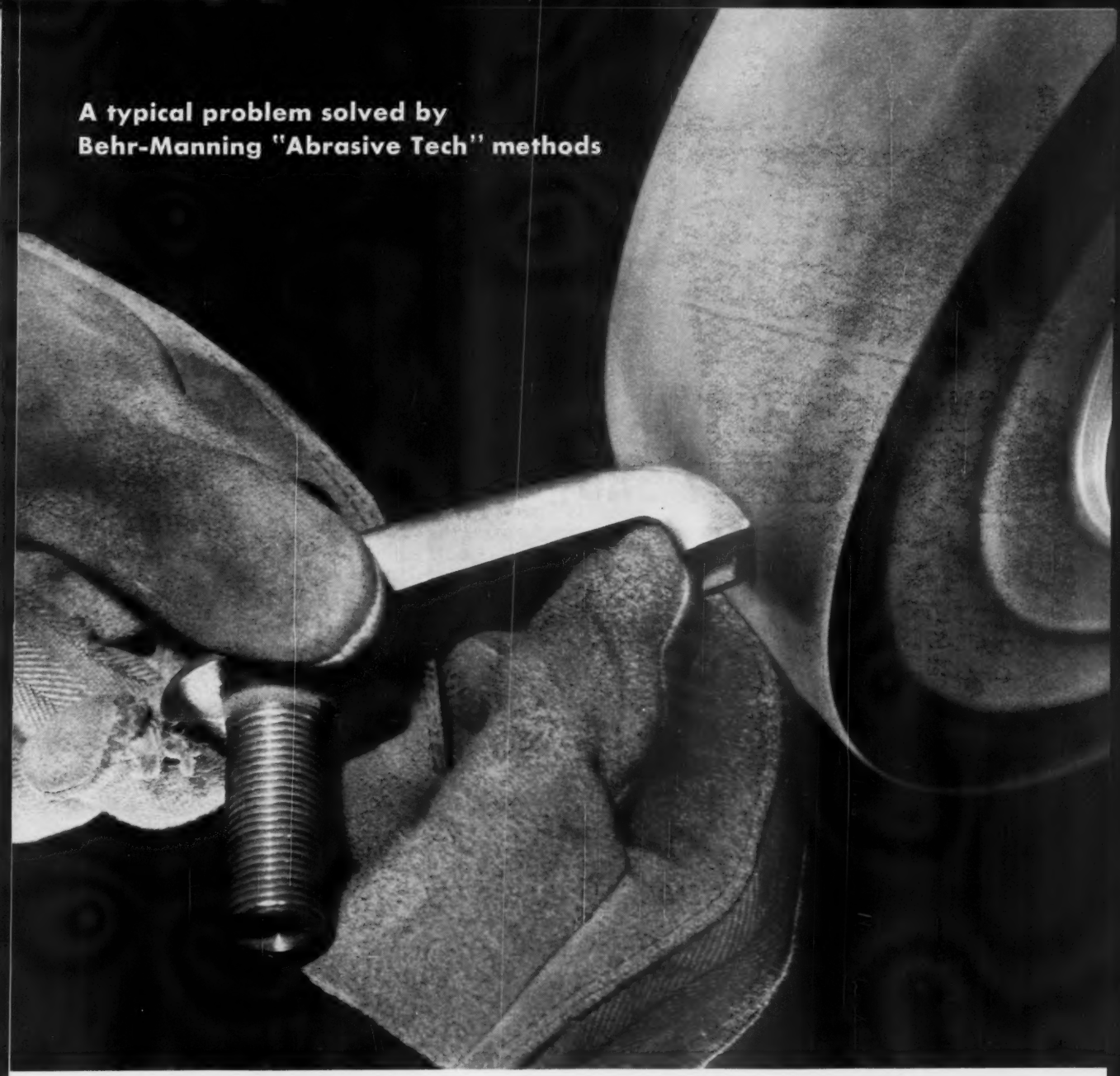
In **Trends of Electric Furnace Growth as They Pertain to Arc Furnace Transformers,** by R. Bry, General Electric Co., Pittsfield, Mass., studies of industry trends and growth characteristics indicate that growth of electric arc furnace production of carbon steel will be approximately one million tons a year for the next 20 years. Alloy steel production also will increase, but only at about one-fourth the rate for carbon steel. Neither growth necessarily will result through supplanting open hearth production.

To meet the increase, transformer manufacturers are expanding facilities and providing greater engineering effort to develop transformers of greater reliability, with more versatility, less maintenance and with longer life. Improvements in electrode control speeds are being made and it appears that speeds up to 20 ft per minute are practicable. Motors for furnace electrode control as well as switchgear also are being improved.

Chapin Hoskins, Institute of Trend Research, Hopkinton, N. H., in a paper **Cyclical Rises and Declines in the Price of Steel Scrap** pointed out that for over 50 years price of steel scrap has risen and fallen in cycles. The cyclical movement may be measured in various periods of time and in terms of rate of change. There are evidences of periodic tendencies in the rate-of-change cycles, and cycles in scrap price are related to cycles in other prices and activities.

In an afternoon session a number of papers were presented on solidification of electric furnace steels in ingot and sand molds. These included **Solidification of Various Metals in Ingot and Sand Molds,** by W. S. Pellini, Naval Research Laboratory, Washington; **Macrosegregation, Microsegregation and Inclusion Types in Chrome-nickel and Chrome Steels,** by J. C. Fulton and R. H. Henke, Allegheny-Ludlum Steel Corp., Brack-

FOUNDRYMAN'S ART once was used to mark and to beautify places of burial. In fact, the first piece of cast iron known in England is the grave slab of Joan Colins, in Burwash Church, to which the date 1350 is ascribed. The grave slab of Anne Forster shown here is in Crowhurst Church, Surrey. Dated 1591, it is a good example of English cast iron tombstones. Such markers were used mostly for persons who were buried inside the churches, in their own pews or perhaps in the opposite aisle



8 steps in finishing were eliminated by using abrasive belts to rough and polish cast-brass faucets prior to plating. Polishing, for example, was faster and smoother with a 3-in. x 90-in. Lightning Metalite Cloth belt, grit 240, running at 9000 sfpm over a 14-in. stitched buff contact roll on a Crown Rheostat Polishing Lathe. The belt is lubricated with a light grease stick. Time, labor, and material costs have all been cut by this "Abrasive Tech" method. Perhaps Behr-Manning technical service may provide similar benefits for your production.

Very often a Behr-Manning methods engineer can provide a helping hand with different finishing problems. Just call the nearest Behr-Manning office for a date. There are 17 well-equipped "Abrasive Tech" Methods Rooms, available for problem-solving, or helping finishers brush up on new techniques: Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Grand Rapids, High Point, Indianapolis, Los Angeles, Teterboro, Camden, San Francisco, Seattle, St. Louis, and Brantford, Canada. Main office and plant: Troy, N. Y. For Export: Norton Behr-Manning Overseas, Inc., New Rochelle, N. Y., U.S.A.

BEHR-MANNING CO.

A DIVISION OF NORTON COMPANY

NORTON ABRASIVES

BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Behr-cat Tapes
NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories

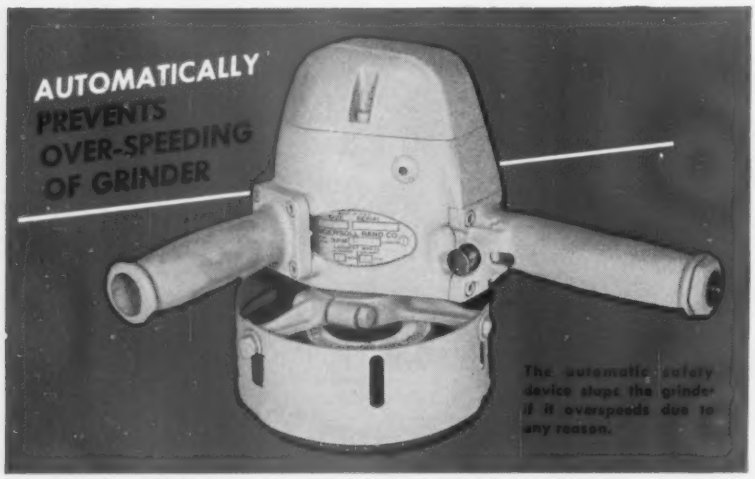
BEHR-MANNING ®

Circle 668 on Inquiry Card—Page 209

NEW

THE ONLY

SURFACE GRINDER with a POSITIVE SAFETY SHUT-OFF!


AUTOMATICALLY PREVENTS OVER-SPEEDING OF GRINDER
The automatic safety device stops the grinder if it overspeeds due to any reason.

PLUS THESE OTHER COST-SAVING OPERATING ADVANTAGES:

- Handles can be set at 90° or 120° for close corner work and operator comfort . . . another Ingersoll-Rand FIRST!
- A responsive governor insures maximum cutting speed and minimum air consumption regardless of load.
- Single point lubrication, double-sealed wheel bearings, large oil reservoir for long life, low cost operation.
- Top of tool is flat for easy pressure application.
- Available in 2 Models and 4 speeds as follows:

  Speeds: 3100—4100—4500—and 6000 rpm.

  Size 41F with push-locking throttle for constant operation.

  Size 41FX with self-closing, safety type throttle.

Ask for a demonstration of this new safety grinder in your shop.

8-343

Ingersoll-Rand

11 Broadway, New York 4, N.Y.

enridge, Pa.; **Solidification of Stainless Steel Ingots,** by B. R. Quenau, U. S. Steel Corp., Duquesne, Pa., and D. J. Carney, U. S. Steel Corp., South Chicago, Ill.; **Some Observations on Deoxidation and Hot Ductility of Type 310 Stainless Steel,** by R. A. Perkins and W. O. Binder, Electro Metallurgical Co., division, Union Carbide & Carbon Corp., Niagara Falls, N. Y.; **Shrinkage and Density of Liquid Killed Steel in Hot Topped Ingots,** by L. H. Nelson, Crucible Steel Co. of America, Pittsburgh; **Relation of Ingot Structure to Transverse Ductility of Heat-Treated High-Strength Steel,** by J. V. Russel and C. R. Weymuller, Republic Steel Corp., Chicago, and **Gas Problems in the Solidification of Steel,** by T. B. King, Massachusetts Institute of Technology, Cambridge, Mass.

Mr. Pellini presented results obtained in numerous investigations conducted at the Naval Research Laboratory on how steel solidifies in metal and sand molds. In addition, similar information was presented on gray and nodular irons.

Second day's sessions, relating to the castings' field, were concerned with hot tearing, ladle refractories and use of oxygen. Chairmen of the first session were P. R. Gouwens, Fahralloy Co., Harvey, Ill., and C. B. Williams, Massillon Steel Casting Co., Massillon, O.

Relationship of Freezing Characteristics to Hot Tearing and Deoxidation, by C. F. Christopher, Continental Foundry & Machine Division, Blaw-Knox Co., East Chicago, Ind., discussed some results of investigations on hot tearing of steel. The author pointed out that all steels have a brittle range, and the key to the hot tear problem is proper heading, gating, chilling and pouring temperature. In the study, the brittle or hot tearing range for a number of steels of varying carbon content was determined by heating specimens to various temperatures and quenching in brine and examining the microstructure. Impact tests at the same temperatures were correlated to the microstructures.

From the investigations the author concluded that hot tearing is a mechanical defect arising from a heterogeneous condition common to all steels. Its solution consists in dissipation of cooling stresses through the medium of scientific heading, gating and chilling systems. Furnace operations in steelmaking must favor high oxidizing systems and a temperature control that will permit the weakest oxidation possible.

Zircon Ladle Linings, by William

D. Emmett, Los Angeles Steel Casting Co., Los Angeles, and Victor E. Zang, Unitcast Corp., Toledo, O., provided information on application, use and results with these ladle linings. Base material is a mixture of zircon sand (117 AFS fineness) and zircon flour (325 mesh) with 1.5 per cent fireclay, 2.5 per cent sodium silicate, and 2.0 per cent water. Electrostatically separated zircon should be used. Between shell and lining ⅛-in.-thick asbestos sheet should be used for insulation. Material must be rammed carefully in thin layers into the ladle, and dried at low heat for 48 hours. Subsequently the lining is fired at the highest possible temperature for 72 hours.

Based on a 7-ton ladle, the cost of a zirconite lining is about 66 per cent less per ton of metal poured than for a brick lining. Disadvantages of zircon linings are that they are not easily kept clean of adhering slag, and the lining, due to its hardness, takes a long time to be knocked out for relining. Advantages are longer life, considerable savings in lining cost per ton of metal poured and cleaner metal.

Zircon Linings in Basic Electric Furnace Practice, by W. A. Koppi, Lebanon Steel Foundry, Lebanon, Pa., indicated that while that type of lining results in better quality metal —that is, greater freedom from inclusions—than with the conventional silica lining, the life is considerably less with basic steel than with acid steel. The material used consists of 80 per cent zircon sand, 15.60 per cent zircon flour, 3.10 per cent fireclay, 1.30 per cent sodium silicate and 3.3 to 3.5 per cent water, and is rammed onto firebrick splits in 9000-lb capacity, teapot spout bull ladles. Total refractory cost with zircon linings was given as 85 cents a ton of metal poured, compared with 45 cents with silica linings.

High-Alumina Ladle Linings, by V. J. Howard, Oklahoma Steel Castings Co., Tulsa, Okla., pointed out that while the cost per ton of metal poured with such material is somewhat higher than for previously used ganister linings, additional variables not included in the cost data—such as material handling, equipment, gas, and space and time needed for drying and preheating extra ladles when ganister was used—would more than equalize the cost. Cost per ton of metal poured from 4-ton ladles was given as 25.3 cents for ganister with 165.4 tons per ladle and for high alumina as 28.6 cents with 423.5 tons per ladle.

Charles Faist, Burnside Steel Foundry Co., Chicago, in a paper

"SAND WIPER" rammer

SEALS OUT sand and dirt for longer life and maximum power

NEW

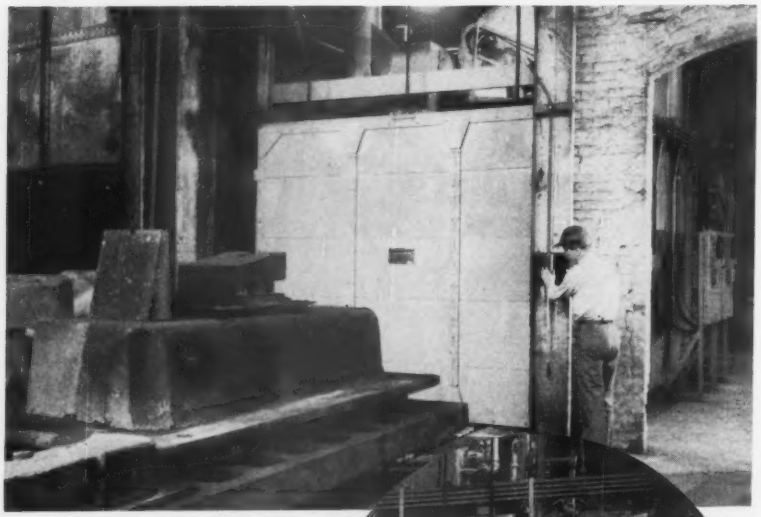
Exclusive new front-end design assures more efficiency, less wear and longer life. Sand, dirt, or abrasive material cannot enter the bore of the guide or the barrel to cause friction and wear. Compact, lighter-weight design improves handling. Balanced blows make the tool float over the work faster and easier. Write for form 5216 describing both bench and floor units or ask for a demonstration in your plant.

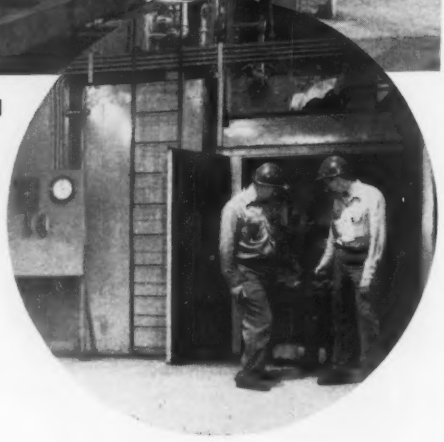
Ingersoll-Rand
11 Broadway, New York 4, N.Y.

8-504

here's another **carl mayer** installation...

Cutting Costs for its Owner





CAR TYPE CORE AND MOLD OVEN

Above—A difficult engineering and installation problem solved by Carl Mayer because the oven filled this space completely. This modern oven, with patented down draft heating system and motor operated lift door, replaced an obsolete brick oven.

RACK TYPE CORE OVEN

Right—Installed at rear of mold oven to form an efficient, flexible combination. Miscellaneous cores are uniformly baked with modern, automatic controls. Operation is efficient and economical.

Carl Mayer's outstanding engineering and design features sold the steel mill where these ovens are now in operation. They incorporate the exclusive Carl Mayer recirculating heating system and special triple slotted panel construction.

Heat loss is reduced up to 1/3, and fuel savings up to 50% over old conventional methods are possible. Temperature uniformity is guaranteed.

Consult Carl Mayer now for any type foundry oven or furnace, large or small, and for any purpose. Write for Bulletin 53-CM.

THE **carl mayer** CORP.

3030 EUCLID AVENUE CLEVELAND 15, OHIO

OTHER PRODUCTS: Heat Treating Ovens and Furnaces • Rod Bakers • Welding Rod Ovens • Paint and Ceramic Drying Ovens • Special Processing Equipment and Accessories

Ganister vs High-Alumina presented some preliminary information on tests being conducted which are favorable to the high-alumina lining, and said that further work will be required.

Closing session on Friday was devoted to a discussion of the use of oxygen in acid steel melting. Participants included E. J. Etowski and Ray Perry, Farrell-Cheek Steel Co., Sandusky, O.; J. S. Absalom, American Steel Foundries, East Chicago, Ind.; A. F. Gross, Ohio Steel Foundry Co., Springfield, O.; V. T. Popp, Cooper Alloy Corp., Hillside, N. J., and Leroy Fink, Electric Steel Foundry Co., Portland, Oreg.

Cast Plaque Wins Prizes in Industrial Arts Competition

Cast brass plaques won top honors for two Portland, Oreg., boys in the 1956 Industrial Arts Award sponsored by the Ford Motor Co.

The accompanying illustration (courtesy *The Esco Ladle*) shows John Waters holding his plaque, complete with gates and risers, which won second prize of cash and a gold pin, plus certificates for himself, Benson Polytechnic School and his instructor, Harvey Summers. After being graduated from Benson Tech last June, John joined Electric Steel Foundry Co., Portland, as a molder's helper.

John Waters Holds Winning Plaque

First prize was won by Rodney Durkey, also of Benson Tech, who made a cast plaque from the same pattern used by John.

The plaque was first modeled in clay, from which a plaster of paris mold was made. Aluminum was then poured in the plaster mold to make a permanent pattern, which was molded in green sand. The sand mold was poured from two ladles simultaneously down two risers.

SIPAC T.M. NON-CARBONACEOUS CORE COATING THAT PRODUCES SMOOTHER FINISHED CASTINGS

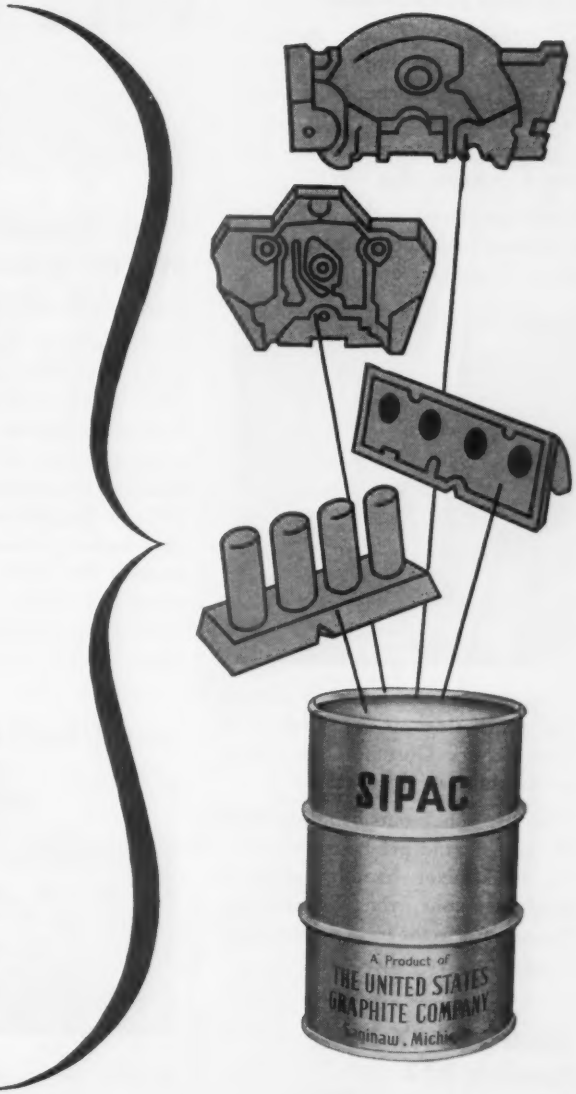
SIPAC United States Graphite Company's complete core coating, requires only the addition of water, and produces bright, gold-colored coating with fine, smooth surfaces—using any foundry sand.

SIPAC is non-carbonaceous and inert; will not react with any molten metal, including grey iron and steel. Clean to handle, its burnished gold color makes cores highly visible—a real help in placement of cores in the mold.

SIPAC costs less and gives improved casting quality. Resists flaking and completely seals core surfaces.

AVAILABLE in 55-gallon drums, (in paste form) ready for mixing and dilution to your desired Baume—even to a scale of 32—without settling.

WRITE TODAY for details about SIPAC or any other United States Graphite Company core and mold coatings.



228

THE UNITED STATES GRAPHITE COMPANY

DIVISION OF THE WICKES CORPORATION, SAGINAW 14, MICHIGAN

GRAPHITAR® CARBON-GRAPHITE • GRAMIX® SINTERED METAL PARTS • MEXICAN® GRAPHITE PRODUCTS • USG® BRUSHES

Circle 672 on Inquiry Card—Page 209

DUST and FUME topics

WHEELABRATOR CORPORATION Mishawaka, Indiana

A 4-FOUNDRY REPORT ON SOLVING DUST, FUME PROBLEMS AT A SAVING

Auto Specialties Uses DUSTUBE® to control shakeout tunnel dust

In handling sand from a shakeout, convection of the hot gases tends to make fine particles billow into the air. Auto Specialties Mfg. Co. of St. Joseph, Michigan, controls dust from 3 shakeouts this way:

Hoods are placed in the under-floor sand tunnels for local exhaust ventilation. These pass air at high velocity, gathering dust before it escapes. The ventilating air is ducted to a Wheelabrator Dustube Dust Collector for trapping the dust.

From the 3 shakeouts handling about 90 tons of sand per hour and a facing sand mixer handling about 4 tons per hour, the Wheelabrator Dustube Collector traps 4 cubic yards of dust each two-shift day.

SEND *TODAY* FOR Catalog 372

This condensed catalog contains valuable details on Dustube construction, principles and installations. Ask for Catalog 372.

STEEL FOUNDRY TRAPS 300 lbs. of ELECTRIC FURNACE FUME DAILY

A Wheelabrator Dustube Dust Collector installation at Sawbrook Steel Castings Co., Lockland, Ohio, collects about 300 lbs. of dust a day in ventilating two size Q Lectromelt furnaces. This represents more than 99% of the electric furnace exhaust that used to permeate the air in and around the plant. To learn more about this efficient installation, write today for a reprint of story that appeared in a leading publication.

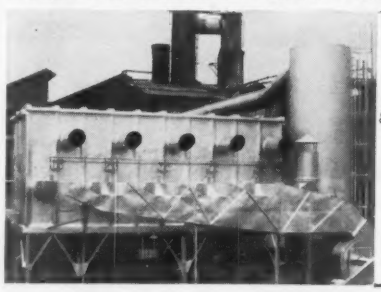
DETROIT MICHIGAN STOVE CO. ELIMINATES METAL DUST with DUSTUBE® Collector

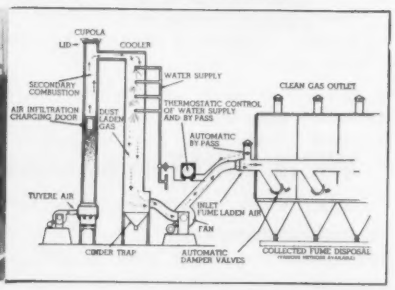
More than 2 tons of fine metallic dust are trapped weekly in a Wheelabrator Dustube Dust Collector at Detroit Michigan Stove Co.

All of the large plate polishers and numerous grinding stands are hooded to keep this dust from getting into the plant air.

The Dustube was selected because of low-cost maintenance and operation, high efficiency and a record of good service from Wheelabrator.

SOLIDS DISCHARGE FROM FOUNDRY CUPOLA ENDED





A certificate of approval without restrictions, from the strict Los Angeles County Air Pollution Board, attests to the efficiency of the Dustube Dust Collector in eliminating discharge of solids from the 54" I.D. gray iron cupola at Lincoln Foundry Corp.

The flow chart of a typical foundry fume control application is shown in the diagram above.

WHEELABRATOR
CORPORATION
505 S. Byrkit Street, Mishawaka, Indiana

Foundry Statistics

ALUMINUM

(Shipments of castings—1000 pounds[1])

	Shipments				Unfilled Orders[2]
	Total	Sand	Perm. Mold	Die	
1954	623,054	156,555	214,407	245,291	.....
1955					
Oct.	71,667	13,852	25,150	31,829	120,689
10 mo.	677,791	137,147	247,019	286,722	.....
Nov.	74,580	13,680	26,284	33,997	127,471
Dec.	74,791	14,655	25,046	34,484	123,881
Total	827,162	165,482	298,349	355,203	.....
1956					
Jan.	74,152	15,861	24,528	33,253	121,924
Feb.	73,096	15,560	23,963	32,949	115,958
Mar.	73,785	16,597	22,816	33,965	110,642
Apr.	67,880	14,732	20,718	31,782	106,477
May	65,786	15,570	19,699	29,814	102,121
June	58,189	13,448	19,067	25,027	102,068
July	52,955	12,398	16,388	23,491	106,620
Aug.	61,407	13,100	18,067	29,553	109,352
Sept.	62,503	12,354	17,855	31,640	111,785
Oct.	74,209	14,389	21,120	37,782	110,818
10 mo.	663,962	144,009	204,221	309,256	.....

MALLEABLE IRON

(Shipments of castings—net tons[1])

	Shipments		Standard		Pearlitic		Unfilled Orders[2]
	Total	For Sale	Total	For Sale	Total	For Sale	
1954	812,016	461,982	.....	.....	.....	.....	.....
1955							
Oct.	90,866	53,804	.....	.....	.....	.....	121,261
10 mo.	905,549	534,074	.....	.....	.....	.....	.....
Nov.	99,280	58,069	.....	.....	.....	.....	116,981
Dec.	99,946	60,409	.....	.....	.....	.....	123,107
Total	1,104,775	652,552	.....	.....	.....	.....	.....
1956							
Jan.	93,562	54,618	79,406	45,747	14,156	8,871	116,520
Feb.	93,533	54,466	80,601	47,606	12,932	6,860	113,616
Mar.	86,941	46,266	75,384	40,869	11,557	5,397	106,491
Apr.	83,320	47,064	72,763	41,449	10,557	5,615	99,573
May	80,138	51,053	69,593	44,424	10,545	6,629	93,677
June	75,635	45,022	66,300	26,791	9,335	5,513	86,247
July	54,340	31,300	45,977	26,881	8,363	4,419	92,078
Aug.	74,422	43,479	62,867	36,759	11,555	6,720	91,883
Sept.	69,380	41,902	59,071	35,534	10,309	6,368	92,553
Oct.	81,528	50,219	68,769	43,109	12,759	7,110	92,734
10 mo.	792,799	465,389	680,731	389,169	112,068	63,502	.....

COPPER-BASE ALLOY

(Shipments of castings—1000 pounds[1])

	Shipments			Unfilled Orders[2]
	Total	Sand	Perm. Mold	
1954	834,668	751,917	48,848	.....
1955				
Oct.	91,071	82,836	4,517	56,844
10 mo.	830,519	746,850	50,930	.....
Nov.	90,222	80,813	5,808	57,145
Dec.	88,167	78,204	6,373	57,241
Total	1,008,898	905,867	63,111	.....
1956				
Jan.	89,767	80,116	6,135	58,445
Feb.	91,706	82,244	5,888	57,515
Mar.	96,085	85,094	6,299	65,560
Apr.	90,679	81,333	5,835	68,106
May	89,188	80,105	5,448	58,789
June	78,921	70,260	5,052	55,019
July	60,926	55,027	3,193	59,661
Aug.	77,619	70,479	3,805	56,364
Sept.	72,109	64,887	3,930	56,990
Oct.	81,049	73,058	4,104	54,363
10 mo.	828,049	742,603	49,689	.....

MAGNESIUM

(Shipment of castings—1000 pounds[1])

	Shipments		Unfilled Orders[2]
	Total	For Sale	
1954	25,777	22,950	.....
1955			
Oct.	2,299	2,074	5,394
10 mo.	23,277	21,131	.....
Nov.	2,324	2,147	5,805
Dec.	2,253	2,016	5,981
Total	27,854	25,294	.....
1956			
Jan.	2,959	2,600	6,237
Feb.	2,977	2,720	6,704
Mar.	3,046	2,842	6,414
Apr.	3,140	2,949	7,137
May	3,021	2,801	7,293
June	2,949	2,765	7,350
July	2,810	2,666	7,937
Aug.	3,059	2,860	8,201
Sept.	3,079	2,863	8,193
Oct.	3,442	3,187	7,893
10 mo.	30,482	28,253	.....

PRODUCTION WORKERS

Estimated Number

	Sept. 1956	Aug. 1956	Sept. 1955
Ferrous	199,100	203,300	208,700
Nonferrous	63,800	61,500	64,600

Average Weekly Earnings

Gray Iron	84.25	83.84	85.45
Malleable Iron	86.50	82.80	84.65
Steel	95.99	92.99	91.15
Nonferrous	91.69	89.57	87.56

Average Weekly Hours

Gray Iron	40.7	40.7	42.3
Malleable Iron	40.8	40.0	41.7
Steel	42.1	41.7	42.2
Nonferrous	41.3	40.9	41.3

Source: Bureau of Labor Statistics

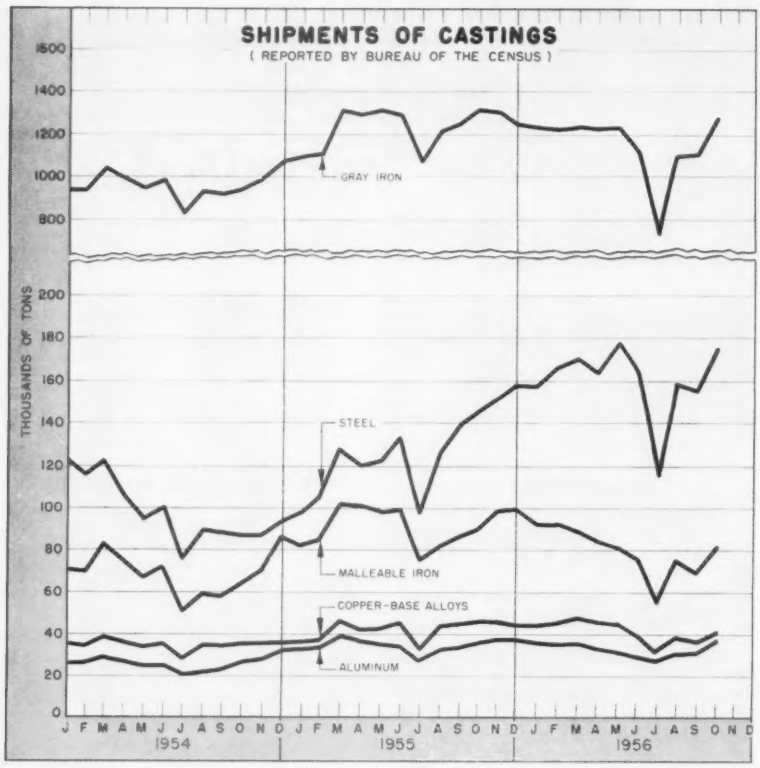
GRAY IRON CASTINGS—SHIPMENTS (Net Tons[1])

	All Castings		Miscellaneous Castings		Heavy Steel Ingot Molds		Chilled Railroad Car Wheels	Pressure Pipe & Fittings	Soil Pipe & Fittings	Unfilled Orders[2]
	Total	For Sale	Total	For Sale	Total	For Sale	Total	Total[3]	Total[3]	
1954	11,532,158	6,322,989	7,292,292	3,064,886	1,784,625	843,899	325,859	1,376,671	743,711	.....
1955										
Oct.	1,310,309	713,671	795,875	327,827	245,749	122,722	31,877	160,875	75,923	1,113,336
10 mo.	12,498,857	6,763,429	7,735,549	3,141,161	2,233,216	1,136,945	340,039	1,417,295	772,748	.....
Nov.	1,305,633	696,523	797,854	327,580	262,506	127,739	29,795	148,560	66,918	1,061,546
Dec.	1,259,740	633,993	786,480	328,445	262,056	133,115	30,833	133,935	46,436	1,075,477
Total	14,837,745	7,987,205	9,161,685	3,715,963	2,739,864	1,392,209	385,041	1,681,630	869,558	.....
1956										
Jan.	1,249,518	677,017	769,826	326,269	257,150	132,581	32,408	131,346	58,788	1,157,818
Feb.	1,214,769	680,494	739,786	322,956	242,207	128,643	35,074	133,254	64,448	1,140,765
Mar.	1,255,405	715,173	752,498	331,749	254,045	139,624	42,676	132,384	73,802	1,162,578
Apr.	1,218,000	702,145	719,109	314,968	237,486	130,473	39,325	151,670	70,410	1,144,870
May	1,235,631	737,081	702,834	321,413	243,719	131,294	38,419	171,859	78,800	1,086,122
June	1,152,156	686,896	656,778	298,578	217,135	102,405	34,028	170,122	74,093	1,041,315
July	762,611	487,736	509,702	241,771	9,556	7,003	32,484	144,964	65,905	1,109,069
Aug.	1,103,195	671,523	639,953	293,673	170,857	89,589	31,712	180,249	80,424	1,074,461
Sept.	1,109,943	648,784	623,743	282,824	233,823	117,708	35,361	151,081	65,935	1,037,283
Oct.	1,274,734	734,384	749,200	331,069	252,203	134,265	30,978	171,377	70,976	996,351
10 mo.	11,575,962	6,741,233	6,863,429	3,065,270	2,118,181	1,113,585	352,465	1,538,306	703,581	.....

STEEL CASTINGS—SHIPMENTS (Net Tons[1])

	All Castings			Carbon			Alloy			Unfilled Orders[2]
	Total	For Sale	Railway Specialties	Total	For Sale	Railway Specialties	Total	For Sale	Railway Specialties	
1954	1,184,096	880,158	135,581	802,321	580,474	120,309	381,285	303,428	15,315	.....
1955										
Oct.	145,674	110,409	23,745	105,345	79,235	22,375	40,329	31,831	1,370	418,063
10 mo.	1,255,443	958,884	190,202	885,279	663,146	175,946	373,538	291,395	14,236	.....
Nov.	152,381	116,908	25,635	111,571	84,064	24,050	40,810	33,518	1,585	453,113
Dec.	158,982	122,201	29,003	116,872	88,894	26,919	42,110	33,307	2,084	475,335
Total	1,530,694	1,166,706	236,880	1,088,489	814,258	219,602	445,769	354,452	17,278	.....
1956										
Jan.	158,618	123,343	27,954	116,092	88,480	26,362	42,526	34,863	1,592	519,401
Feb.	165,398	128,598	30,833	123,279	94,998	29,112	42,119	33,600	1,721	567,330
Mar.	170,045	130,839	31,991	126,583	95,779	29,953	43,462	35,060	2,038	594,990
Apr.	163,708	125,015	27,475	121,723	91,332	25,302	41,985	33,683	2,173	600,242
May	178,227	142,025	35,949	134,919	107,575	33,695	43,308	34,450	2,254	608,275
June	164,661	129,147	31,296	122,483	95,621	28,801	42,178	33,526	2,495	597,103
July	117,984	96,350	19,833	88,971	72,837	18,545	29,013	23,513	1,288	611,233
Aug.	159,831	127,001	32,965	119,025	94,257	30,601	40,806	32,744	2,364	586,496
Sept.	155,046	121,705	33,496	116,905	91,266	31,314	38,141	30,439	2,182	562,937
Oct.	175,630	135,798	34,762	132,250	101,961	32,743	43,380	33,837	2,019	558,478
10 mo.	1,609,148	1,259,821	306,554	1,202,230	934,106	286,428	406,918	325,715	20,126	.....

[1]Source: Bureau of Census. [2]For sale only. [3]All cast iron pipe is shipped for sale.


SHIPMENTS OF CASTINGS
(REPORTED BY BUREAU OF THE CENSUS)
THOUSANDS OF TONS
GRAY IRON
STEEL
MALLEABLE IRON
COPPER-BASE ALLOYS
ALUMINUM
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1954
1955
1956

COKE PRODUCTION AND CONSUMPTION

(Net tons*)

	Production	Consumption Total	Consumption By Foundries
1954	59,526,723	59,139,159	2,479,926
1955			
Oct.	6,630,609	6,813,118	283,818
10 mo.	61,739,353	62,740,304	.....
Nov.	6,545,862	6,577,008	285,021
Dec.	6,865,032	6,949,073	284,936
Total	75,150,247	76,266,385	3,154,052
1956			
Jan.	6,914,836	6,182,704	275,660
Feb.	6,476,135	6,506,044	260,949
Mar.	6,896,593	6,861,698	267,414
Apr.	6,633,363	6,572,836	247,664
May	6,725,396	6,587,030	241,558
June	6,235,691	6,163,668	214,484
July	2,301,442	1,596,570	193,431
Aug.	5,614,997	5,281,627	225,978
Sept.	6,453,229	6,609,309	211,015
Oct.	6,740,182	6,941,386	251,577
10 mo.	60,991,864	59,302,872	.....

INGOT BRASS AND BRONZE

(Shipments in net tons)

	1955	1956
Jan.	25,201	27,736
Feb.	25,349	24,949
Mar.	29,713	28,310
Apr.	27,641	25,808
May	23,708	23,437
June	23,141	18,842
July	18,513	17,364
Aug.	27,013	23,812
Sept.	26,349	20,929
Oct.	25,228	23,045
Nov.	25,102	21,818
Dec.	21,448	.....
Total for year	298,406	166,466

Source: Defense Council of the Ingot Brass and Bronze Industry

ZINC-BASE ALLOY

(Shipments of castings—1000 pounds[1])

	Shipments Total	Shipments For Sale	Unfilled Orders[2]
1954	520,458	322,802	.....
1955			
Oct.	71,529	46,421	85,489
10 mo.	632,233	398,407	.....
Nov.	74,960	47,433	93,001
Dec.	70,807	47,404	86,120
Total	778,000	493,244	.....
1956			
Jan.	68,050	43,750	83,234
Feb.	66,854	42,300	76,283
Mar.	65,760	42,806	73,025
Apr.	58,274	37,518	71,730
May	52,205	33,920	60,634
June	47,775	31,983	61,809
July	42,227	27,301	64,806
Aug.	52,321	33,281	73,411
Sept.	46,340	33,967	79,390
Oct.	65,450	41,943	75,706
10 mo.	565,256	368,769	.....

INDEX OF FOUNDRY EQUIPMENT ORDERS

Foundry Trades Only

(Net Orders Closed, New Equipment)

	1955	1956
Jan.	81.0	195.6
Feb.	90.4	169.0
Mar.	163.6	152.7
Apr.	178.6	135.2
May	145.7	207.0
June	186.8	156.7
July	213.4	110.3
Aug.	134.0	188.3
Sept.	156.7	114.7
Oct.	108.6	122.2
Nov.	154.4	....
Dec.	183.9	....

Note: Figures are percentages of the base period 1947-49 taken as 100 per cent monthly average. This is a new base period. Source: Foundry Equipment Manufacturers Association.

IRON AND STEEL SCRAP CONSUMPTION

(Gross tons*)

	All Scrap Total	By Types of Furnace: Cupola Total	Air Total	Electric Total
1954	54,780,758	8,542,581	855,207	6,100,444
1955				
Sept.	6,060,491	881,158	119,550	753,318
9 mo.	53,273,429	7,978,691	932,567	6,266,576
Oct.	6,443,349	944,685	113,411	820,642
Nov.	6,441,351	952,906	112,056	839,971
Dec.	6,496,796	910,675	115,436	830,404
Total	72,654,925	10,786,957	1,273,470	8,757,593
1956				
Jan.	6,688,977	909,201	114,378	880,980
Feb.	6,345,421	892,373	116,418	833,661
Mar.	6,733,076	923,912	101,087	863,950
Apr.	6,490,680	862,233	96,514	842,216
May	6,491,567	855,007	104,485	899,967
June	5,994,989	776,299	87,525	831,456
July	1,986,613	621,064	56,071	399,441
Aug.	5,453,927	803,123	92,200	807,131
Sept.	6,231,017	738,824	84,627	841,783
9 mo.	52,416,267	7,382,036	853,305	7,200,585

PIG IRON PRODUCTION AND CONSUMPTION

	Production** (Standard grades—net tons) Total	Foundry	Malleable	Basic	Low Phos. Intermediate Low Phos. & Bessemer	Consumption* (By type of furnace—gross tons) Total	Cupola	Air	Electric
1954	58,113,924	2,241,436	2,798,646	47,485,047	5,587,465	52,373,541	4,364,418	215,158	155,258
1955									
Nov.	6,636,649	241,727	353,713	5,404,584	636,625	5,973,223	469,485	22,621	18,148
11 mo.	70,163,372	2,616,511	3,557,080	56,848,843	7,150,938	61,813,702	4,882,075	236,488	224,435
Dec.	6,887,667	242,446	329,607	5,660,307	655,307	6,131,680	444,459	23,520	21,971
Total	77,114,073	2,858,957	3,884,971	62,570,394	7,799,751	68,944,698	5,326,534	260,008	246,406
1956									
Jan.	6,985,945	210,755	317,216	5,806,140	651,774	6,275,224	441,634	24,062	11,766
Feb.	6,539,199	229,440	370,208	5,350,650	588,901	5,871,824	430,792	24,307	13,010
Mar.	7,083,877	196,533	352,856	5,843,852	690,636	6,316,836	427,177	23,737	18,725
Apr.	6,860,833	210,319	333,660	5,623,647	693,207	6,077,074	413,537	22,757	17,179
May	6,873,102	232,375	329,750	5,625,067	685,910	6,064,632	413,494	24,074	28,596
June	6,387,608	213,769	331,871	5,227,488	614,480	5,642,004	379,803	22,039	23,460
July-Aug.	6,190,197	337,077	382,369	4,854,291	616,450	963,749	303,341	14,702	5,582
Sept.	6,873,064	236,809	316,590	5,636,000	683,665	4,618,718	404,948	22,719	17,604
Oct.	7,245,650	245,762	321,188	6,000,279	678,421	6,053,147	366,848	19,642	18,239
Nov.	6,977,457	140,277	341,244	5,831,885	664,051	.....	.....	.....	.....
11 mo.	68,016,932	2,253,116	3,397,012	55,799,299	6,567,495	.....	.....	.....	.....

*Source: U. S. Dept. of Interior. Bureau of Mines. **Source: American Iron & Steel Institute. [1]Source: Bureau of the Census. [2]For sale only.

Michigan Model 12B handles 500 tons of sand per day . . .

Foundry management reports

"Output doubled, downtime down 90%"

Superior Steel & Malleable Castings Company, Benton Harbor, Michigan, originally purchased their 16 cubic foot Model 12B to help another loader of the same rated capacity. But the Michigan moved almost twice as much tonnage as the other machine—approximately 500 tons of sand per day. So it alone now handles nearly all bulk material; the other machine used only at times of peak demand.

More power to dig

This added output has been no surprise to Superior Company officials. Neither has a 90% reduction in downtime. With a 20% margin of weight and power over other machines in its size class, the Michigan digs its way into tough material where other machines just spin their wheels. Low-level bucket action enables the Michigan operator to carry loads low, with good visibility and safe center of gravity. Clark's exclusive power-shift transmission makes all shifts quickly—high, low, forward, reverse—saves vital seconds on every cycle.

Maneuverable in tight quarters

Despite its extra weight and power, the Michigan Model 12B is completely competitive in terms of dimensions and maneuverability. It operates neatly and efficiently in boxcars, narrow aisles, storage bins. In fact, it is easier to operate in tight quarters like these because the operator does not have to clutch and declutch between Forward-Reverse. He shifts merely by flicking a small steering post power-shift lever . . . doesn't clutch or even have to take his left hand off the steering wheel! Torque converter, planetary wheel drive axle take up all shocks.

Write for demonstration

Until you've seen this Michigan Model 12B *in your plant,* don't buy any bulk-handling equipment. No other machine can match the Model 12B's combination of features or amount of work produced. Clip coupon to your letterhead to arrange to see it.

Michigan is a registered trade-mark of

CLARK® EQUIPMENT

Arrange demonstration of Model 12B:

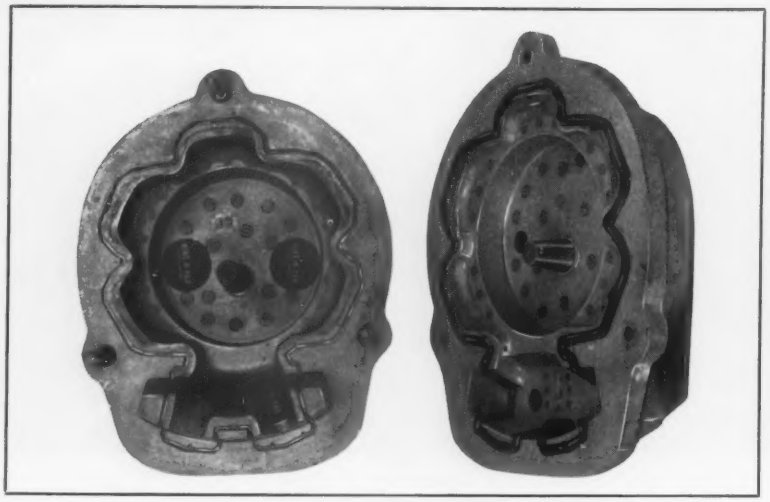
CLARK EQUIPMENT COMPANY
Construction Machinery Division
2475 Pipestone Road
Benton Harbor 3, Michigan

Circle 674 on Inquiry Card—Page 209

STOP BLOW-BY with Dike-O-Seal®

PATENTS APPLIED FOR

THE POSITIVE SEAL MOLDED AND BONDED INTO YOUR CORE BOXES



- Reduces initial pattern costs.
- No parting line maintenance.
- Eliminates brass or steel facings.
- No mudding or patching of cores.
- Greater core accuracy and consistent permeability.

Statements by our customers
FULL DETAILS IN BULLETIN 57. WRITE TODAY FOR YOUR COPY

Dike-O-Pad

FIRST AID FOR CORE BOXES

Dike-O-Pad, the revolutionary new pressure sensitive abrasion resistant pad, has been designed specifically to prevent erosion under blow-tubes. Original application and replacement is so simple there is no need to remove the core-box from production and yet the pads will withstand many thousand blows. They are now saving money for foundries everywhere. Write for price list and samples.

Dike-O-Seal INCORPORATED 1209 WEST 59TH STREET CHICAGO 36, ILLINOIS
CABLE ADDRESS "DIKEO"

Meditations of a Sandman

By HAROLD E. HENDERSON
H. C. Macaulay Foundry Co.
Berkeley, Calif.

"Age of Miracles"

WE occasionally hear that the age of miracles is past. Until yesterday, your sandman was willing to concur. But yesterday a miracle of foundry sand-practice occurred! Your sandman suddenly became imbued with the enthusiasm of youth!

You see, it was this-a-way. A salesman had been trying for weeks to get me to experiment with what he called his new "waterless" binder. He claimed that with this material I would have a molding sand which would produce a casting finish comparable to that of "shell." No water was needed, no clay or bentonite, no seacoal, no cornflour—no nothin', except his magic formula.

Of course, the guy was nuts, and I told him so, in some of my most colorful and profane English! He proved to be a patient cuss and just grinned at me with that unmistakable expression which betokens a delicate mixture of pity and contempt. This made me even more angry; so I resorted to a few of my choice Turkish epithets, which (fortunately for me) were Greek to him.

He insisted that he had the answer to a foundryman's prayer—a waterless molding sand in which undesirable gas was held to an irreducible minimum and beneficial gas was produced in exactly the correct ratio. Having regained some measure of self-control, and realizing that this guy was not to be dissuaded, I decided, to get rid of him, that I would go along with the experiment.

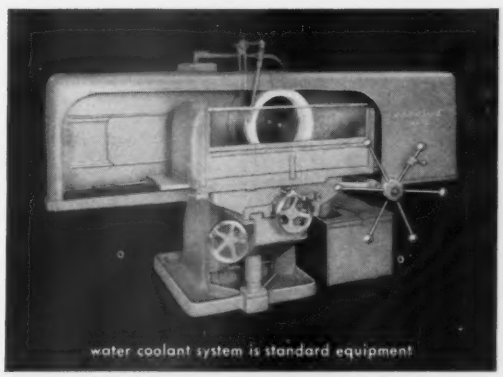
He gave me some literature on his miracle binder and wrote out a "mix" for me which he insisted must be followed to the letter to obtain desired results. I read it and didn't like it, but by that time was too weak to argue the matter. So I made some perfunctory promises and dismissed my loquacious friend with a long and sincere sigh of relief.

Later, under the soothing influence of a pipeful of Kentucky burley, I decided that I had better get this

why MACHINE it off–when you can GRIND it?

Stock really comes off with an Abrasive 18″ Face Grinder. Sixty-five thousandths of an inch at a pass! A rugged 15 H.P. motorized Abrasive spindle turns the wheel at 900 R.P.M. Surface speed is 4500 feet per minute. 24″ table travel, plus 18″ wheel gives big work capacity.

Time is money! Machining flat surfaces wastes both! Grind it off faster, with better surface finishes, with an Abrasive 18″ Face Grinder just as leading metalworking plants — those really making money — are grinding forgings, castings and dies.


water coolant system is standard equipment

TYPICAL APPLICATIONS ■ Castings . . . eliminates milling or planing . . . requires less stock to be left on for finishing . . . as much as 3/16″ of stock can be saved on each surface. ■ Automobile Body Dies. ■ Plastics Molding Dies. ■ Molded Insulating Fire Brick. ■ Ceramic Insulators. ■ All types of Forging Dies. ■ WHEREVER FLAT, SQUARE SURFACES ARE REQUIRED.

ABRASIVE ACCURACY BOOSTS PRODUCTION

Complete, detailed, fully-illustrated Catalog is yours free. Write for it.

ABRASIVE
MACHINE TOOL COMPANY
EAST PROVIDENCE, RHODE ISLAND

Circle 676 on Inquiry Card—Page 209

Malleabrasive reduces overall cleaning costs as much as 50% because—

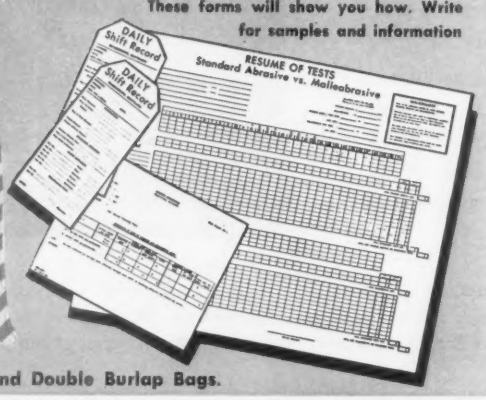
- It wears 2 to 4 times longer than ordinary shot and grit.
- It increases output of cleaned castings.
- It reduces wear on machine parts and cuts machine down time.

These are not just claims. You can prove these savings right in your own plant, in your own machines. We supply all the necessary forms and instructions.

Malleabrasive has reduced costs in more than 800 plants. Why not yours?

make your own 30 day test...

These forms will show you how. Write for samples and information



In easy to handle 50-pound Double Burlap Bags.

MALLEABRASIVE

THE GLOBE STEEL ABRASIVE CO., MANSFIELD, OHIO ®

Sold by Pangborn Corporation, Hagerstown, Md., and by leading distributors of foundry supplies from coast to coast.

waterless sand experiment out of my hair, once and for all!

After cleaning my 4-cu-ft muller, I dumped in 100 lb of Nevada No. 120, slightly rounded grain silica sand. To this, I added 4½ lb of the "miracle" powdered binder and mulled the two for slightly over 30 seconds. (I'm following the huckster's formula, mind you.)

Next, I poured in 2½ lb (or pints) of No. 100 viscosity engine oil and continued mulling for five minutes longer. Shutting off the muller, I ran my delicate fingers through this dream-mix, and I didn't like what I felt. It was dry as dust, had no perceptible strength, and no molder on earth would have given it a second serious thought. I gloated as I visualized my next meeting with "Miracle Boy!"

Taking another look at the written formula, I found myself guilty of one omission: I had overlooked the final ingredient—1 pt of methyl alcohol. I secured this from the pattern shop, convinced that it had no value whatever, except perhaps as a release agent, which I didn't need. However, I had to follow instructions.

So I restarted the muller and sprinkled in the alcohol. Man alive! Talk about an immediate transformation! I had it! That mix suddenly felt wet — almost too wet. Green strength had developed at an incredible rate! After two minutes of mulling, I didn't dare continue, for our objective was flowability, not strength.

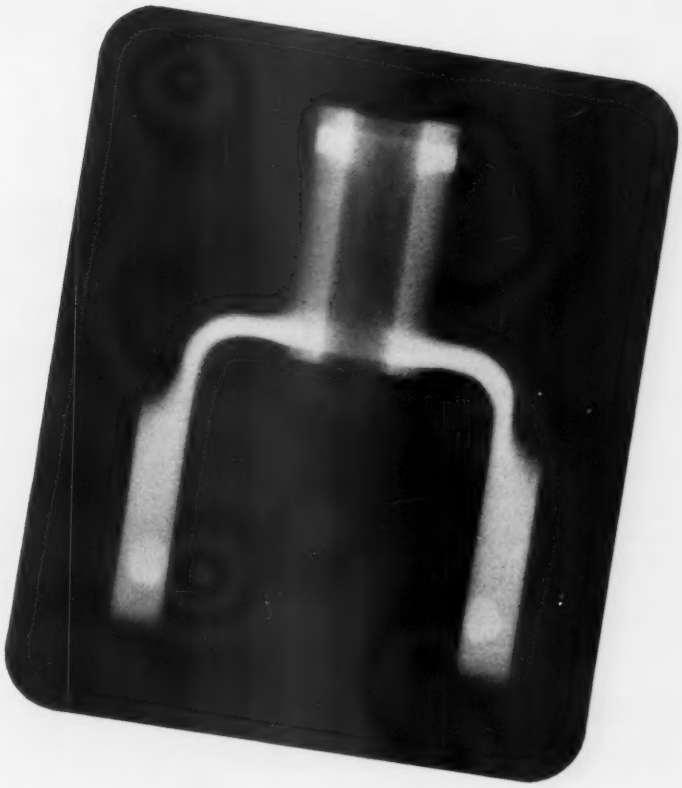
Dumping the batch, I wheeled it to a bench molder, who was instructed to use it as facing on a matchplate pattern of ashtrays bearing the company's name in small raised letters. Five molds were to be made, four of which were to be poured in iron, and one in aluminum. All molds were rammed hard.

As is not unusual in a jobbing shop, however, my miracle mix lay exposed in the wheelbarrow almost an hour before it was used, and consequently all or most of the alcohol evaporated. The sand was as dry, and apparently as weak, as if this volatile liquid had never been added.

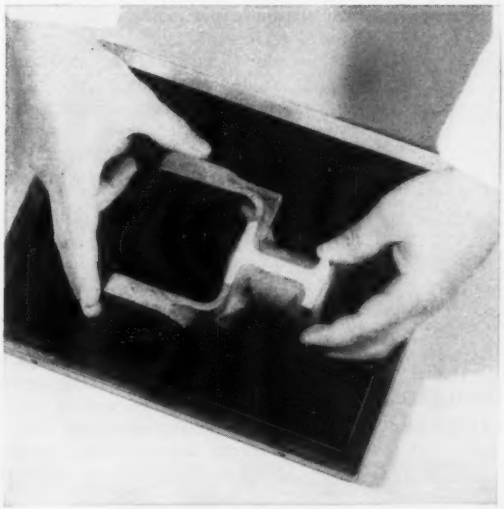
Regardless of its obviously useless condition, it was used as a facing on the five molds mentioned—and it performed perfectly. Well, almost perfectly. The resultant castings were not quite perfect, of course, for the perfect casting never has been made and probably never will be. But those made with the "Miracle Mix," gentlemen, came as close to shell finish as anything our foundry has ever produced. And, remember, this was our initial experiment!

Two lab tests of this sand were made. The first, as it came fresh

Ansco watches over quality for industry



The ABC's of industrial radiography



3 Ansco X-ray films cover all the radiographic needs of any industrial shop. Use them in *your* work. It's convenient to know you needn't shop around . . . *that you've got the best!*

ANSCO SUPERAY "A"—Fastest of the fine-grain films, Superay "A" penetrates ½" steel at 150 KVP in just 75 seconds! Sensitive, too, it detects flaws of less than 1% at certain thicknesses.

ANSCO SUPERAY "B"—Extreme contrast and extra fine grain characteristics make Superay "B" ideal for obtaining maximum definition.

ANSCO SUPERAY "C"—This high speed film makes short work of routine inspection, can give you dramatic savings in testing costs, time and labor.

Ansco offers you the best films . . . and chemicals . . . for every industrial X-ray need. *Let Ansco watch over your quality.*

America's oldest maker of photographic materials . . . **Ansco**

BINGHAMTON, NEW YORK

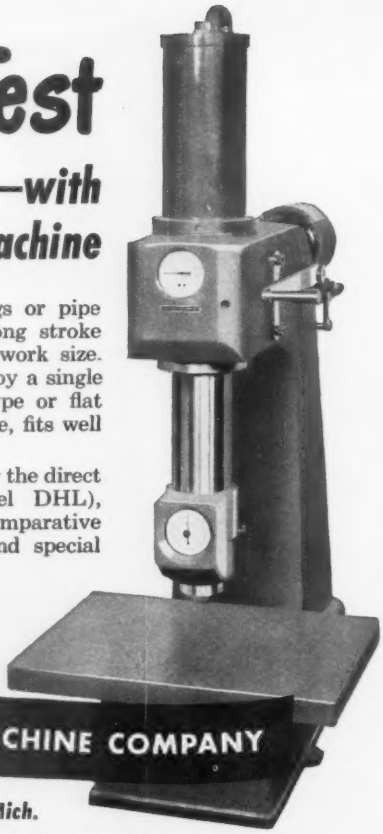
A Division of General Aniline & Film Corporation

Brinell Test

large pieces fast—with this long stroke machine

Large awkward castings, forgings or pipe are easily tested because the long stroke eliminates screw adjustment to work size. The hydraulic ram is controlled by a single lever. Large, stationary roller-type or flat table makes work handling simple, fits well into a conveyor line.

Choice of plain Brinell machine or the direct reading machine (shown, model DHL), where dial at end of ram gives comparative hardness immediately. Larger and special machines may also be had.



Write for more information on all our Brinell testing machines.

DETROIT TESTING MACHINE COMPANY

9382 Grinnell Ave., Detroit 13, Mich.

Circle 679 on Inquiry Card—Page 209

★ ★ ★ This is where PATTERNS of quality and precision are produced for the automotive, aircraft and metalworking fields . . . backed by 35 years of know-how.

★ ★ ★ These superior PATTERNS are produced under the personal supervision of the two owners and a highly skilled group of employees.

★ ★ ★ The owners are naturally proud of their reputations. That's your guarantee of quality work and reasonable prices. Let them give you a quotation on your next job—and give you a pleasant surprise.

AUTOMOTIVE PATTERN *company*

Wood and Metal Patterns

18840 John R. St., Detroit, Michigan

from the muller, revealed a perm of 40, green compression strength of 6.7 lb, a moisture content (oil and alcohol) of 2.0 per cent and a deformation of 17.5, all on Dietert instruments. Twenty-four hours later, with the sand dust-dry (alcohol gone), the perm was 35, the strength 6.6, moisture (oil) probably 1.5 per cent and deformation 16.0.

Summary: Despite dryness, this sand remained in place as rammed. It did not crumble or stick to the pattern, nor were the sand grains displaced by the impingement or attrition of the flowing metal.

Questions naturally arise. Can this mix be used throughout the plant with safety? Will it be prohibitive in cost? Will it create an obnoxious, smoky pour-off? Will the rapid dryout make it too difficult to handle? To all of the above, I must say frankly that I don't know! I have no doubt that it will waterproof sand if much of it is used, but, remember, no water is used with this stuff. So that isn't a problem. At present, I consider it only a device to obtain high-quality finish for a specialty line of light castings. Tomorrow, we may have a different story to tell, and our sights may be raised considerably.

Even though this single experiment produced a sensational result, it hardly qualifies me as an authority on waterless sand. It does, however, provide the challenge for continued experiment, with the promise of a more thoroughly rewarding experience in foundry sand practice. Perhaps I'm being naive or overenthusiastic, but from my humble viewpoint, this experiment was truly a miracle of chemistry.

Now for the $64,000 questions. Will it produce good castings over a wide range of casting weights and types, or is it suitable only for ashtrays and such? Can this reaction or result be produced by one who is not a magician?

I can't resist the temptation to bring this story to a close by indulging in an ironical twist. The two men most immediately concerned with the promotion of this binder are, first, the boy who has labored for three years in his vine-covered laboratory to create this bonding agent and, second, his coworker, a consultant of national reputation whose wrinkled brow betokens the weight of years and a skeptical attitude toward miracles.

One insists that as a result of his creative genius, the foundry industry will hit a new and finer tempo. The other shakes his head in a gesture of obvious disbelief and comments cryptically, "Use it only on ashtrays and doll's eyes!"

Circle 680 on Inquiry Card—Page 209

X TO ALL FOUNDRIES

GOOD NEWS! EXCITING NEWS! PROFITABLE NEWS!

"X" TYPE FOUNDRY WHEELS

"X" TYPE FOR PORTABLES

"X" TYPE FOR SWINGS

"X" TYPE FOR STANDS

We've broken the "X" barrier. The factor of "X" is no longer a challenging mystery. After a long period of experimentation, followed by extensive pilot plant and field testing, Precision has ready for you—THE USER—a sensational new resinoid wheel for FOUNDRY GRINDING. It has proved its superiority in every way on all types of high speed FOUNDRY SNAGGING:

ON—Swing Frame Grinders!

ON—Floor Stand Grinders!

ON—Portable Grinders using Straight Wheels!

ON—Portable Grinders using Cup Wheels!

ON—Portable Grinders using Cones!

"X" TYPE IS NEW! "X" TYPE IS DIFFERENT! "X" TYPE IS REVOLUTIONARY!

If you want to increase wheel life and maintain cut rate: "X" TYPE does it! If you want to increase cut rate and maintain wheel life: "X" TYPE does it!

And "X" TYPE DOES IT IMPRESSIVELY! Not by just a few per cent but by 25% or more.

No matter what wheels you have been buying for your high speed FOUNDRY SNAGGING; no matter what the purchase price, you owe it to yourself to TRY—then BUY "X" TYPE wheels!

REMEMBER!
"X" TYPE resinoid wheels for high speed FOUNDRY GRINDING are exclusive with PRECISION GRINDING WHEEL COMPANY

Send for our brochure "X" TYPE FOUNDRY WHEELS

PRECISION

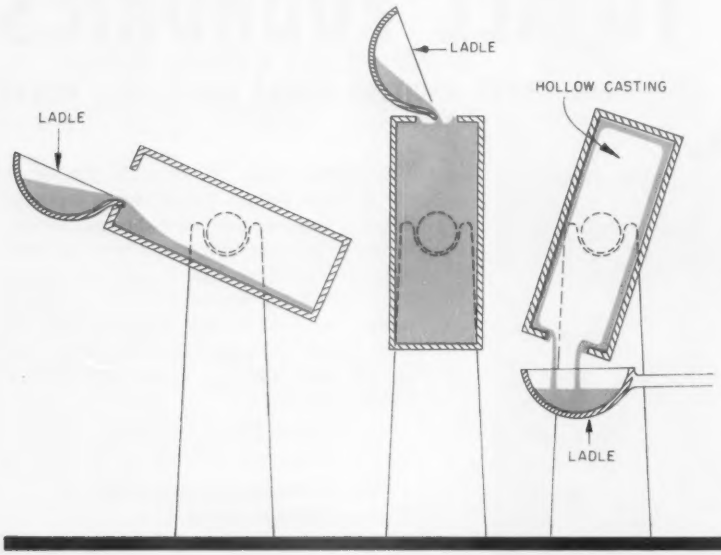
GRINDING WHEEL COMPANY

PHILADELPHIA 36, PENNSYLVANIA

Circle 681 on Inquiry Card—Page 209

Trouble Shooting

By C. W. AMMEN



Left—Mold is tilted at start of pouring and is worked slowly to an upright position as it fills.

Center—When chilled wall appears at top of mold, invert the mold to return center metal to the ladle.

Right—Casting is thicker at bottom than it is at the pouring end

Slush Castings

Dear Charlie:

For the life of me, I can't decide whether or not slush castings should be called a foundry product. Having got involved in an order for a large amount of them, however, I have talked myself into believing they are or should be so considered. The items of which I speak are bases used by a firm which bronzes baby shoes. You know what I mean—for $5 or so, you send this gink little Rollo's first brogans, pick out the style of mount you want and wait. Rollo's gunboats are plated and screwed down on a nice bronze mount (bronze you think!).

Four styles are used by the turkey I have in tow: One ashtray style, one plain-base and two styles of book ends. They are made of some sort of zinc-base alloy slush cast in highly polished brass molds,each of which has a clamping device and trunnions. He then imitation-bronzes the bases, loads them with plaster and covers the bottom or open end with a chunk of green felt. It you think Japanese "P" traps are thin, you should see the samples he showed me!

He says that his former source had no trouble. He just poured the metal in, slushed her around a bit, dumped out the liquid metal, opened the mold, and presto! So he says. The sad part is that he wants one awful lot of castings. Have tried die-casting scrap, pure zinc, etc.—also hot molds and cold molds. I get them ranging from solid to paper.

Sincerely,
Sam

Dear Sam:

I guess you could call slush castings foundry products after a fashion. I know that one helluva lot of them are made for decorative purposes and trim. Some ornate lamps are simply a fancy slush casting slipped over a piece of black iron pipe. Finishes run from actual plating to imitation finishes and patinas.

Have seen some very fancy horses and other objects made this way. In fact, I received as a wedding gift a clock supported by a maiden clad in her birthday clothes and standing on an imitation mahogany base. The girl finally peeled, exposing her interior. The base became gum or some such wood, and the clock—when it does run—sounds like a rattler full of sashweights.

I once made some casket trim slush castings for old man L. E. up on Magazine Street. I was successful only after many bad castings. My trouble, I think, was similar to yours, and it was not until I finally had the proper alloy, which had a very broad solidification range, that I licked the job.

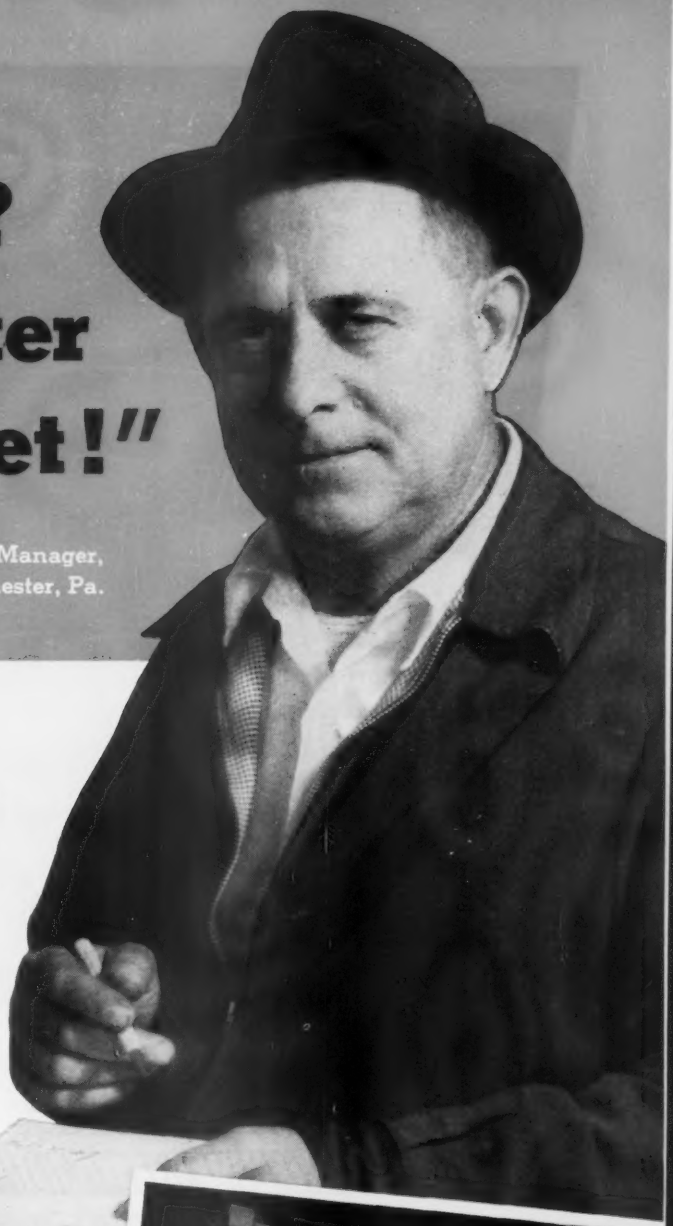
With zinc-base slush metals, the controlling factor seems to be maintenance of the proper zinc-to-aluminum ratio. A high-grade zinc with aluminum content of 4 to 6 per cent generally offers the range you have to stay within to get any good castings. Probably the alloy most frequently used is 0.25 Cu, 4.75 Al and remainder Zn. It must be remembered that, as with any other form of casting, scrap materials are just pure folly. Cadmium, lead and tin become undesirable impurities in a zinc-base slush metal. In small amounts, they may cause network corrosion, cracking and the like.

With 0.25 Cu, the aluminum should not exceed 4.75 per cent.

Of course, the temperature affects the time the metal must remain in the mold before dumping, as do thickness, metal temperature and rocking of the mold. Some operators coat the

"Pangborn Blastmaster? Nothing better on the market!"

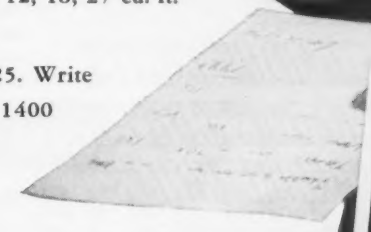
says **WILLIAM BURROWS**, Plant Manager,
The Atlantic Steel Castings Co., Chester, Pa.



"When we needed new blast equipment," says William Burrows, "we checked around. We found that the Pangborn Blastmaster Barrel had *more* advantages—more of the things that add up to a good deal for The Atlantic Steel Castings Co. Our Pangborn is one of the best things we ever invested our money in."

Blast cleaning can represent a sizable investment. If you're in the market, you would be wise to compare the Blastmaster Barrel against competitive makes. The Blastmaster is tailored to individual requirements in sizes of 1½, 3, 6, 12, 18, 27 cu. ft. Many exclusive features.

For details, send for Bulletin 225. Write to PANGBORN CORPORATION, 1400 Pangborn Blvd., Hagerstown, Maryland.



Because of this 27 cu. ft. Blastmaster and other Pangborn equipment, Atlantic has cut cleaning time from two full 8-hour shifts (16 hours every day) to only *six* hours. To achieve peak cleaning efficiency, this size Blastmaster uses *two* Rotoblast units for *double* hot spots in cleaning area.

Pangborn®

blast cleans cheaper

Circle 682 on Inquiry Card—Page 209

molds with soot or stove polish.

I am fairly sure that there is no positive control of metal thickness. As with anything else of this nature, experience is the most important factor, and to get it you have to make your share of scrap. The mold is clamped, and trunnions are placed in the rack. Tip the mold and pour downside with a hand ladle. As the mold fills, allow it to come to a vertical position and rock it gently, watching the edge for a metal skin. At the right moment, invert the mold, pouring the remaining liquid metal back into the ladle.

Some slush casting mixes you might try include these: 1. 5.5 Al, remainder Zn. 2. 4.75 Al, 0.25 Cu, remainder Zn. 3. 5 Al, 3.0 Cu, remainder Zn. 4. 6 Al, 0.05 Si, remainder Zn.

For lead-base slush castings, try these compositions: 1. 1.0 Sn, 0.1 Cu, 0.5 As, 13.0 Sb, remainder Pb. 2. 0.65 Sn, 12.5 Sb, 0.65 max As, remainder Pb.

I am sure that you can get a good alloy from your smelter that will do the job, but you also will have to get the knack of handling the molds properly.

Oh yes, the casket trim metal which finally worked out O.K. for me was approximately 0.55 Sn, 12.55 Sb, 0.85 As and 86 Pb.

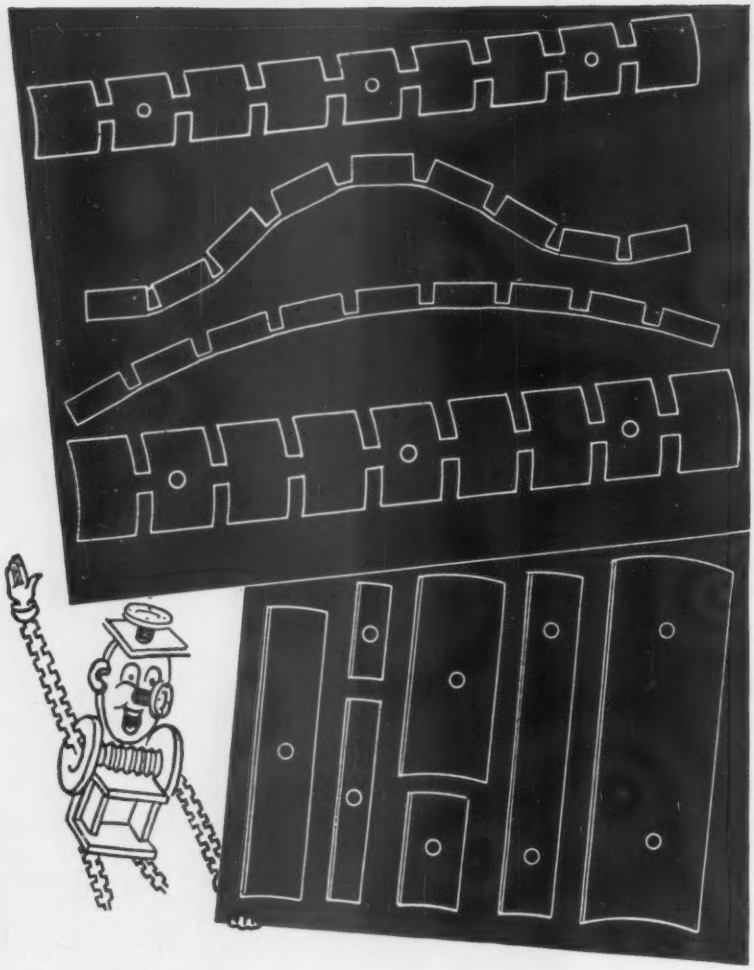
Sincerely,
Charlie

Offers Reference Photos for Magnetic Particle Inspection

Discontinuities in iron and steel castings detectable by the dry powder magnetic particle method now may be classified by comparison with reference photographs recently published by the American Society for Testing Materials as "Tentative Reference Photographs for Magnetic Particle Indications on Ferrous Castings" (E 125-56T).

These photographs show indications observed on actual castings and have been reproduced through the courtesy of the Steel Founders' Society of America from photographs obtained from its member companies.

Forty-seven reference photographs are included, covering linear discontinuities (hot tears and cracks), shrinkage, inclusions, internal chills and unfused chaplets, porosity, weld discontinuities, false indications and magnetic anomalies. E 125-56T contains explanations of the reference photographs and a set of four charts showing reproductions. It may be purchased for $2.50 from ASTM, 1916 Race St., Philadelphia 3, Pa.


Milwaukee
PATENTED ADJUSTABLE RADIUS CHILLS
STANDARD RADIUS CHILLS
SPECIAL CHILLS
Eliminates Small Surface Cracks in Fillets
Prevents Molten Steel from Cutting into Sand
Easily Bent to Fit Along Curved Edges
Saves Cleaning and Welding Costs
Available in Fixed Radii from 1/4" to 1 1/2"
Milwaukee Chaplet & Mfg. Co.
1025 SOUTH 40th STREET • MILWAUKEE 46, WISCONSIN

HELPFUL

Foundry Literature

CIRCLE NUMBERS on card for literature you want.

FOUNDRY

INFORMATION SERVICE

Handy Reader Service cards bring you more information on products or services described or advertised in this issue.

451. Brass and Bronze Ingots

I. Schumann & Co., 4391 Bradley Rd., Cleveland 9, O.—Illustrated booklet, "Above and Beyond the Specifications," describes a new process for making brass and bronze ingots with rigidly controlled properties. Ingots are said to be extremely uniform in weight. A new functional shape is intended to facilitate piling and storing and eliminate accidents.

452. CO_2 Binder and Sands

Eastern Clay Products Dept., International Minerals & Chemical Corp., 20 North Wacker Dr., Chicago 6, Ill.—Folder discusses the use of DonCO_2 liquid binder in making cores and molds by the CO_2 process. Mixing, core and mold preparation, pattern equipment, gassing, collapsibility, properties and cost factors are considered.

453. Die Casting Machines

Hydraulic Press Mfg. Co., Division of Koehring Co., Mt. Gilead, O.—Bulletin 5700 describes the new, improved line of H-P-M cold chamber die casting machines with capacities from 200 to 800 tons. Large cutaway view shows construction features. Specification, standard and optional features are included.

454. Molding Machines

Davenport Machine & Foundry Co., Davenport, Iowa—Bulletin 2004 illustrates and describes company's jolt rollover draw machines with capacities from 750 to 6000 lb and a maximum flask size from 22 x 34 to 54 x 80 in.

455. Compressors and Pumps

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.—Ratings, operation and construction features and advantages of compressors, vacuum pumps and blowers to meet all air and gas handling requirements are covered in bulletin 1d AL. Single and two-stage rotary sliding-vane compressors and vacuum pumps, single and multistage centrifugal blowers and multistage axial blowers are discussed.

456. Grinding Abrasive

Norton Co., Worcester 6, Mass.—Vol. 47, No. 9, *Grits and Grinds,* is devoted to an evaluation of company's 44 Alundum, an aluminum oxide abrasive said to be suited for swing frame, floor stand, bench stand or portable grinders for snagging castings or cutting down weld beads.

457. Lithium Cartridges

Lithium Corp. of America Inc., 2500 Rand Tower, Minneapolis 2, Minn.—Bulletin discusses the cause of porosity in copper and copper-base alloys and presents instructions for the use of lithium cartridges as a deoxidizing agent in the melt.

458. Epoxy Resin Compounds

Smooth-On Mfg. Co., 572 Communipaw Ave., Jersey City 4, N. J.—Technical bulletin 10 (revised) contains a description of techniques involved in using epoxy resin compounds for casting. The bulletin discusses Smooth-On's Metalset and Sonite

FOUNDRY INQUIRY CARD Circle item number for further information on anything described or advertised in this issue **FEBRUARY 1957**

401	426	451	476	501	526	551	576	601	626	651	676	701	726
402	427	452	477	502	527	552	577	602	627	652	677	702	727
403	428	453	478	503	528	553	578	603	628	653	678	703	728
404	429	454	479	504	529	554	579	604	629	654	679	704	729
405	430	455	480	505	530	555	580	605	630	655	680	705	730
406	431	456	481	506	531	556	581	606	631	656	681	706	731
407	432	457	582	507	532	557	582	607	632	657	682	707	732
408	433	458	483	508	533	558	583	608	633	658	683	708	733
409	434	459	484	509	534	559	584	609	634	659	684	709	734
410	435	460	485	510	535	560	585	610	635	660	685	710	735
411	436	461	486	511	536	561	586	611	636	661	686	711	736
412	437	462	487	512	537	562	587	612	637	662	687	712	737
413	438	463	488	513	538	563	588	613	638	663	688	713	738
414	439	464	489	514	539	564	589	614	639	664	689	714	739
415	440	465	490	515	540	565	590	615	640	665	690	715	740
416	441	466	491	516	541	566	591	616	641	666	691	716	741
417	442	467	492	517	542	567	592	617	642	667	692	717	742
418	443	468	493	518	543	568	593	618	643	668	693	718	743
419	444	469	494	519	544	569	594	619	644	669	694	719	744
420	445	470	495	520	545	570	595	620	645	670	695	720	745
421	446	471	496	521	546	571	596	621	646	671	696	721	746
422	447	472	497	522	547	572	597	622	647	672	697	722	747
423	448	473	498	523	548	573	598	623	648	673	698	723	748
424	449	474	499	524	549	574	599	624	649	674	699	724	749
425	450	475	500	525	550	575	600	625	650	675	700	725	750

751	761	771	781	791	801	811	821	831	841	851	861		
752	762	772	782	792	802	812	822	832	842	852	862		
753	763	773	783	793	803	813	823	833	843	853	863		
754	764	774	784	794	804	814	824	834	844	854	864		
755	765	775	785	795	805	815	825	835	845	855	865		
756	766	776	786	796	806	816	826	836	846	856	866		
757	767	777	787	797	807	817	827	837	847	857	867		
758	768	778	788	798	808	818	828	838	848	858	868		
759	769	779	789	799	809	819	829	839	849	859	869		
760	770	780	790	800	810	820	830	840	850	860	870		

NAME .....

POSITION .....

FIRM .....

STREET .....

CITY ..... ZONE.....

STATE .....

PRODUCT MANUFACTURED .....

This card good in U.S. and Canada only—Expires Apr. 15, 1957

epoxies, but the same information generally applies to the handling of all epoxy resin compounds.

459. Heat Treating Units

Ipsen Industries Inc., 715 South Main St., Rockford, Ill.—Specifications, dimensions and general information on single and double zone, controlled atmosphere, heat treating units are contained in bulletin T-19A. Furnaces are designed so that work is heated entirely by convection without being exposed to direct radiation from the radiant tubes.

460. Industrial Sands

Wedron Silica Co., 135 South LaSalle St., Chicago 3, Ill.—Brochure outlines the processes and facilities that go into making the company's sand products for the foundry and other industries. Twenty-four standard sand grades for Wedron's rounded grain silica product are listed.

461. Snagging Grinders

Foundry Grinder Division, Standard Electrical Tool Co., 2488-96 River Rd., Cincinnati 4, O.—Specifications, special features and general information on 20, 24 and 30-in. single wheel and double end, twin motor snagging grinders are found in bulletin C1.

462. Air Atomizing Burner

Cleaver-Brooks Co., 326 East Keefe Ave., Milwaukee 12, Wis.—Low pressure air atomizing burner that burns residual oil at rate of 90 gallons per hour is described in bulletin AD-158.

463. Plastic Tooling Resin

Industrial Sales Division, United States Gypsum Co., 300 West Adams St., Chicago 6, Ill.—Temporary IGL bulletin 400 discusses the properties and applications of Epoxical plastic tooling resin for plastic models, drill jigs, checking fixtures and Keller patterns. When used with glass cloth, Epoxical provides a tool and pattern-making medium of high strength, light weight, dimensional stability and accuracy.

464. Sand Ramming

Beardsley & Piper, Division Pettibone Mulliken Corp., 2424 North Cicero Ave., Chicago 39, Ill.—Bulletin 310 presents basic principles, adaptability and applications of stationary Sandslinger and Speedslinger machines. Typical foundry layouts using the equipment are included.

465. Refractory Brick

Mullite Refractories Co., Shelton, Conn. — Quality features, physical properties and chemical analyses, dimensions and technical performance data of Shamva mullite super refractory brick and special shapes are provided in catalog 102.

466. Phenolic Products

General Electric Co., Chemical & Metallurgical Division, One Plastics Ave., Pittsfield, Mass.—Line of phenolic molding materials and resins is described in brochure CDC-322. Technical data, special properties and product features are highlighted.

467. Melting Furnace

Ajax Enginering Corp., Trenton 7, N. J.—Folder presents the principle of operation, description, advantages and applications of a 100 kw Ajax-Tama-Wyatt low frequency twin coil induction furnace for melting brass, zinc and aluminum.

468. Abrasive Wheels

Abrasive Wheel Dept., Manhattan Rubber Division, Raybestos-Manhattan Inc., Passaic, N. J.—Grinding wheel net price and data book lists actual consumer net prices of rubber and resinoid-bonded grinding wheels used by industry. Book 6465 also contains a presentation of sizes, shapes and types of grain available for industrial grinding wheels.

469. Material Handling

Material Handling Institute Inc., Educational Division, Suite 759, One Gateway Center, Pittsburgh 22, Pa.—Brochure, "Career Opportunities in Material Handling," describes the career opportunities in the material handling field and tells how to take advantage of them.

470. Conical Scrubbers

Hardinge Co., York, Pa.—Bulletin 37-B contains a description of company's conical scrubbers with ratings, dimensions and approximate capacities. Applications are discussed and numerous installations are pictured.

471. High-Vacuum Pumps

F. J. Stokes Corp., 5500 Tabor Rd., Philadelphia 20, Pa.—Catalog 752 contains specifications for Stokes vacuum pumps as well as tables of formulas, constants and conversion factors used in vacuum processing. Solutions to problems of pump selection for typical vacuum systems also are given.

472. Combustion Safeguards

Selas Corp. of America, Dresher, Pa. — Bulletin SC-1006 describes the operation and construction of Selas automatic fire checks, which

FIRST CLASS
Permit No. 36
CLEVELAND, OHIO

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

—4c POSTAGE WILL BE PAID BY—

FOUNDRY
Penton Building
Cleveland 13, Ohio

Reader's Service Dept.

detect, localize and extinguish flashback in mixture supply line where a combustible mixture of fuel gas and air is distributed to heating equipment. Also described are Selas safety blowouts which prevent flashback and relieve excessive flashback pressure in combustible mixture main supply piping.

473. Cutting Torch

Arcair Co., 419 South Mt. Pleasant St., Lancaster, O.—Bulletin 6-1 explains the Arcair process and the use of the Arcair torch for cutting, gouging, beveling or grooving of all metals. The torch can be used with any direct current welding machine and melts any metal with an electric arc and blows the melted metal away with a continuous jet of compressed air, constantly directed at the point of arc.

474. Plastic Eyeshields

United States Safety Service Co., 1215 McGee St., Kansas City 6, Mo.—Form SFA901 describes flexible plastic eyeshields of fogproof design that incorporate a noncorrosive nickeled mesh ventilating screen over 10 in. long.

475. Centrifugal Fans

Chicago Blower Corp., 9863 Pacific Ave., Franklin Park, Ill.—Supplement No. 1 to Bulletin C-103 contains detailed performance charts on various types of quiet operating, large capacity, slow speed centrifugal fans.

476. Brush Finishing

Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.—Booklet, "Brushamatic, How to Improve Finishing the Osborn Way," tells the story of company's Brushamatic machines that do work from finishing of extremely rough, heavy operations to the most precise finishing of aircraft components. Charts aiding in the selection of the proper brush are included.

477. Steel Grit Blasting

Wheelabrator Corp., 1102 South Byrkit St., Mishawaka, Ind. — Brochure, "Steel Grit Provides Bright-As-A-Penny Non-Ferrous Finishes," tells how plants are using steel grit abrasives to achieve lustrous finishes on brass, aluminum or bronze. Case histories from three companies are included.

478. Tubular Conveyors

Hapman Conveyors Inc., Division of Hapman-Dutton Co., Kalamazoo, Mich.—General descriptions, typical installations, advantages, engineering and construction details, operating instructions and a series of case studies of tubular conveyors in industry are presented in form HC-451.

479. Epoxy Resin Systems

Permacel Tape Corp., New Brunswick, N. J.—Summary chart outlines the physical and electrical properties of epoxy resin systems handled by Permacel. Information includes average pot life, properties of cured samples, volume resistivity, dielectric constant and dissipation factor.

480. Arc Welders

Air Reduction Sales Co., Division of Air Reduction Co., 150 East 42nd St., New York 17, N. Y.—Selenium rectifier and direct current motor generator arc welders, alternating and direct current engine driven arc welders and alternating current transformer arc welders are illustrated and described in form ADC 708C. Specifications for each machine, from ampere ratings to outside dimensions, are included.

481. Lift Truck Batteries

C & D Batteries Inc., Conshohocken, Pa.—Bulletin IT-525/56 covers line of Slyver-Clad batteries for use with hand motorized lift trucks. Battery ratings and capacities, details of design and construction, dimensions and weights are given.

482. Fluorescent Lamps

Sylvania Electric Products Inc., 60 Boston St., Salem, Mass.—Uses, advantages and features of VHO (very high output) fluorescent lamps are detailed in brochure.

483. Refractory Products

Ironton Fire Brick Co., Ironton, O. —Refractory products list provides brand names, typical applications of

FOUNDRY

INFORMATION SERVICE

Handy Reader Service cards bring you more information on products or services described or advertised in this issue.

FOUNDRY INQUIRY CARD Circle item number for further information on anything described or advertised in this issue **FEBRUARY 1957**

401	426	451	476	501	526	551	576	601	626	651	676	701	726
402	427	452	477	502	527	552	577	602	627	652	677	702	727
403	428	453	478	503	528	553	578	603	628	653	678	703	728
404	429	454	479	504	529	554	579	604	629	654	679	704	729
405	430	455	480	505	530	555	580	605	630	655	680	705	730
406	431	456	481	506	531	556	581	606	631	656	681	706	731
407	432	457	582	507	532	557	582	607	632	657	682	707	732
408	433	458	483	508	533	558	583	608	633	658	683	708	733
409	434	459	484	509	534	559	584	609	634	659	684	709	734
410	435	460	485	510	535	560	585	610	635	660	685	710	735
411	436	461	486	511	536	561	586	611	636	661	686	711	736
412	437	462	487	512	537	562	587	612	637	662	687	712	737
413	438	463	488	513	538	563	588	613	638	663	688	713	738
414	439	464	489	514	539	564	589	614	639	664	689	714	739
415	440	465	490	515	540	565	590	615	640	665	690	715	740
416	441	466	491	516	541	566	591	616	641	666	691	716	741
417	442	467	492	517	542	567	592	617	642	667	692	717	742
418	443	468	493	518	543	568	593	618	643	668	693	718	743
419	444	469	494	519	544	569	594	619	644	669	694	719	744
420	445	470	495	520	545	570	595	620	645	670	695	720	745
421	446	471	496	521	546	571	596	621	646	671	696	721	746
422	447	472	497	522	547	572	597	622	647	672	697	722	747
423	448	473	498	523	548	573	598	623	648	673	698	723	748
424	449	474	499	524	549	574	599	624	649	674	699	724	749
425	450	475	500	525	550	575	600	625	650	675	700	725	750
751	761	771	781	791	801	811	821	831	841	851	861		
752	762	772	782	792	802	812	822	832	842	852	862		
753	763	773	783	793	803	813	823	833	843	853	863		
754	764	774	784	794	804	814	824	834	844	854	864		
755	765	775	785	795	805	815	825	835	845	855	865		
756	766	776	786	796	806	816	826	836	846	856	866		
757	767	777	787	797	807	817	827	837	847	857	867		
758	768	778	788	798	808	818	828	838	848	858	868		
759	769	779	789	799	809	819	829	839	849	859	869		
760	770	780	790	800	810	820	830	840	850	860	870		

NAME .....

POSITION .....

FIRM .....

STREET .....

CITY ..... ZONE .....

STATE .....

PRODUCT MANUFACTURED .....

This card good in U.S. and Canada only—Expires Apr. 15, 1957

products and special services available from company. List includes information on all classes of fire clay brick plus 70 per cent alumina brick. Data on 25 refractory specialties also is available.

484. Steel Shelving

Republic Steel Corp., Berger Division, Canton 5, O.—How to plan storage areas efficiently by using Republic Steel's storage engineering service is featured in catalog ES-1087.

485. Automatic Controls

Mercoid Corp., 4201 Belmont Ave., Chicago 41, Ill.—Automatic controls using sealed mercury contact switches for heating, ventilating, air conditioning, industrial equipment and applications are subject of catalog 857. Switches for pressure, temperature, differential, limit, liquid level and similar control functions are covered.

486. Lift Truck Operation

Hyster Co., North East Clackamas St., Portland 8, Oreg.—"How To Operate A Lift Truck," uses cartoons to aid reading and is packed with information about the operation of a lift truck, preventive maintenance, safety and basic material handling, slanted for both the beginner and experienced driver.

487. Plastic Firebrick

J. H. France Refractories Co., 3162 France Rd., Snow Shoe, Pa.—Technical data tables, installation instructions and product descriptions of super duty and regular duty plastic firebrick are found in single sheet service catalog. Brief descriptions of company's high alumina plastic, ladle plastic, bench mix for pot furnace use and chrome ore plastic also are included.

488. Metal Sawing

W. O. Barnes Co., 1297 Terminal Ave., Detroit 14, Mich.—"Handbook of Metal Sawing" covers the proper selection and use of hand and power hack saw blades. Blade selection is simplified by charts. Recommended cutting speeds, feeds and techniques also are tabulated.

489. Pole-Type Buildings

Dow Chemical Co., Dept. PEN 14, Midland, Mich.—Booklet, "Low-Cost Pole Buildings for Industry," illustrates many uses made of pole buildings. Pole construction provides attractive, flexible design and a sturdy building that can be adapted to pattern storage requirements.

490. Conveyor Lubricators

J. N. Fauver Co., 51 West Hancock Ave., Detroit 1, Mich.—Catalog CL956 describes the fundamental improvements incorporated into the company's 100 and 700 Series automatic conveyor lubricators.

491. Magnesium Trucks

Magline Inc., Pinconning, Mich. — Ten product bulletins cover line of four-wheel magnesium trucks. Detailed descriptions and specification data on platform, trailer, box and towveyor trucks are presented.

492. Air Cylinders

S-P Mfg. Co., Solon, O.—Catalog 110 illustrates and describes square end air cylinders available in 11 bore sizes from 1½ through 14 in. and with 21 types of mountings.

493. Air-Cooled Compressors

Gardner-Denver Co., Quincy, Ill.—Bulletin AC-15 illustrates and describes single and two-stage air-cooled compressors with working pressures from 85 to 175 psi. Models shown include bare compressors and those with horizontal and vertical tanks. Complete specifications are provided.

FOUNDRY Reprints

494. Gray Iron Foundry

Modern Practice Typified by New Gray Iron Foundry by William G. Gude details the features and equipment in the Bullard Co.'s new $7 million plant that provides increased capacity, improved working conditions, higher quality castings and lower costs than company's former foundry.

495. Shell Molding

Thermal Studies in Shell Molding by Wylie J. Childs and J. B. Hyman reports on a study of the temperature of shells during the investment, curing and pouring operations and provides data which can be a guide in the selection of correct thickness and strength of shells.

496. Automotive Foundry

The New Chevrolet Foundry is a staff-written, 28-page detailed report on the Chevrolet Foundry, Tonawanda, N. Y. Coupled with many photographs and schematic drawings of various departments, the article fully covers each operation in this huge plant that pours more than 1000 tons of gray iron daily.

FIRST CLASS
Permit No. 36
CLEVELAND, OHIO

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

—4c POSTAGE WILL BE PAID BY—

FOUNDRY
Penton Building
Cleveland 13, Ohio

Reader's Service Dept.

THE RIGHT ALLOY FOR ANY FOUNDRY NEED

ELECTROMET offers a complete line of ladle and cupola addition agents

Additions of ferro-alloys will adjust the composition of the base iron to make it suitable for the particular work on hand. You can reduce chill in thin-sectioned castings or improve strength and machinability. You can, if desired, increase hardness and improve resistance to wear and heat-all through the simple addition of alloys. And there's an ever wide variety of ELECTROMET alloys to choose from.

ELECTROMET not only has the alloys to meet your needs, but also furnishes technical assistance in their most effective use. Please phone or write the ELECTROMET office nearest you for detailed information on these or other ELECTROMET products.

ELECTRO METALLURGICAL COMPANY
A Division of
Union Carbide and Carbon Corporation
30 E. 42nd Street UCC New York 17, N. Y.

In Canada: Electro Metallurgical Company, Division of Union Carbide Canada Limited, Welland, Ontario

METALS DO MORE ALL THE TIME . . . THANKS TO ALLOYS

Electromet
TRADE-MARK

ALLOYS FOR LADLE ADDITIONS

Ferrosilicons (50%, 75%, 85%, and 90%) In grades and sizes suitable for all conditions in the iron foundry. Silicon reduces chill in thin-section gray iron castings.

"SMZ" Alloy—A strong, super-graphitizing alloy and chill reducer. Contains zirconium and manganese to enhance the inoculating properties.

Calcium-Silicon—Inoculant for reduction of chill and for developing high-tensile strength. Especially suited for use in low carbon-equivalent irons.

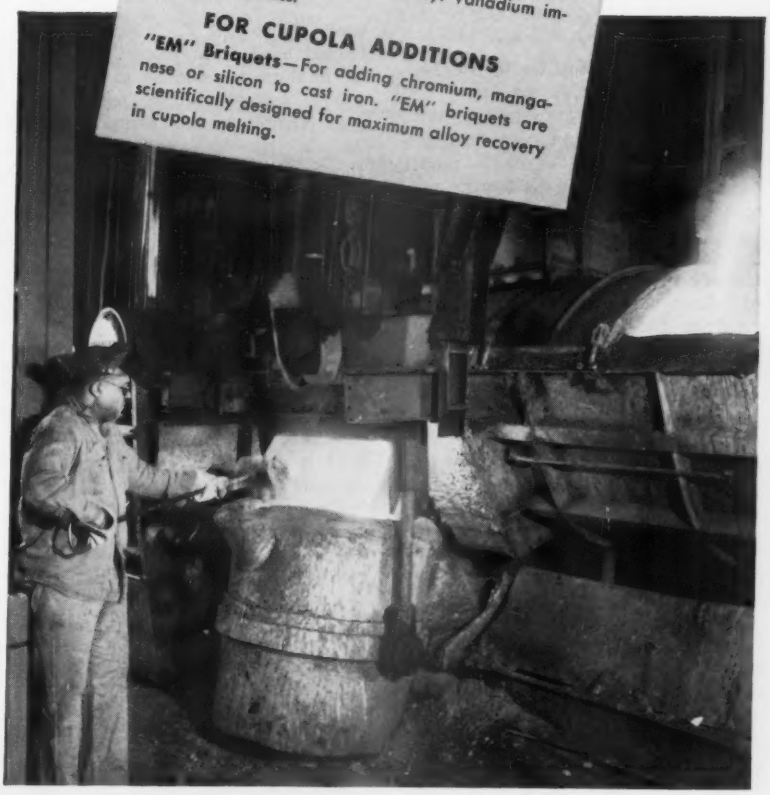
Zirconium Alloys (12 to 15% and 35 to 40%) Graphitizers for reducing chill, aiding machinability, and improving tensile properties.

Ferrochromium Alloys—Available in many grades for cast iron. All grades have rapid solubility. Widely used to improve the hardness, strength, and heat and wear resistance of cast iron.

Ferrovanadium—ELECTROMET foundry grade ferrovanadium has good solubility. Vanadium improves toughness.

FOR CUPOLA ADDITIONS

"EM" Briquets—For adding chromium, manganese or silicon to cast iron. "EM" briquets are scientifically designed for maximum alloy recovery in cupola melting.



Nation-wide service through these conveniently located offices:

Birmingham • Chicago • Cleveland • Detroit • Houston
Los Angeles • Phillipsburg, N. J. • Pittsburgh • San Francisco

Circle 684 on Inquiry Card—Page 209

New Equipment and Supplies

Hardness Tester

automatically classifies up to 1000 Rockwell tests per hour

American Chain & Cable Co., Wilson Mechanical Instrument Division, Bridgeport 2, Conn.—Console model fully automatic hardness testing machine will classify up to 1000 Rockwell tests per hour by hand feeding individual pieces. The unit will classify tested work pieces into one of three categories — correct, too hard or too soft. The device has controlled hardness limits as close as two Rockwell numbers, is equipped with an automatic counter and has an automatic safety stop for pieces not fed properly. The unit can be set up to test materials that vary in thickness from 0.030 to 6 in. and will test any metal on the regular Rockwell scale, such as A, B, C, D, E, F, G, H and K. As each piece is tested, one of three lights—red, green or yellow—will indicate the hardness classification.

For More Details Circle No. 401—Page 209

Cope and Drag Sealer

is used when copes and drags are hot from drying ovens

Presstite-Keystone Engineering Products Co., 3798 Chouteau Ave., St. Louis, Mo.—No. 990 high-temperature KopeSeal is designed to seal the cope and drag of dry sand molds when such molds are used immediately after removal from the drying ovens and are still hot. The sealer is said to stand up well at temperatures up to 600° F. It comes in extruded bead form from 3/16 to ¾-in. in diameter and 30 in. long. No. 990 is self-dissipating, leaves nothing harmful in the sand, gives off no toxic gases and is harmless to the hands. The sealer prevents runouts, blows and fins.

For More Details Circle No. 402—Page 209

Corebox Vibrator

is portable and can be attached to any size corebox

Cleveland Vibrator Co., 2828 Clinton Ave., Cleveland 13, O.—Portable, air-powered corebox vibrator can be attached to any size corebox to assist in a clean draw and a core of perfect dimensions. According to the manufacturer, the vibrator will eliminate the banging of coreboxes with hammers, save time, avoid damage to coreboxes and preclude distortion or broken edges in cores. The VG-3 vibrator is attached to a reinforced section of the corebox and is operated during the drawing operation. The jaw opens to 5½ in. Over-all dimensions of the vibrator are 6 x 9 x 10½ in. Weight is about 70 lb. It develops 4000 vpm with air consumption of about 30 cfm at 80 psi.

For More Details Circle No. 403—Page 209

Surface Comparator

provides a fast method for checking surface finishes

Bausch & Lomb Optical Co., Rochester 2, N. Y.—Surface comparator provides a simple, speedy, accurate method for checking flat surface finishes against a desired standard. Operator compares the finished surface either with a commercially available roughness standard strip or with a sample bearing the desired finish prepared in the plant. Sample must be at least 1 in. square. Operator sees a circular image, one-half of which is the standard and the other

the surface being checked. Both surfaces are magnified ten times. A built-in illumination system emphasizes surface irregularities.

For More Details Circle No. 404—Page 200

Abrasive Spheres

have been developed for special barrel finishing applications

Norton Co., Worcester 6, Mass.—Barrel finishing media, Tumblex "S" abrasive spheres, come in five different diameters and are made of Alundum aluminum oxide abrasive. The spheres are suited for barrel finishing hard-to-contact recesses or intricate shapes or parts where conventional tumbling abrasive tends to wedge or will not reach. Manufacturers with parts which may be suit-

For More Details on These Items
Use Reply Card—Page 209

able for finishing with Tumblex S may send samples to the company's sample processing laboratory.
For More Details Circle No. 405—Page 209

Synthetic Wax

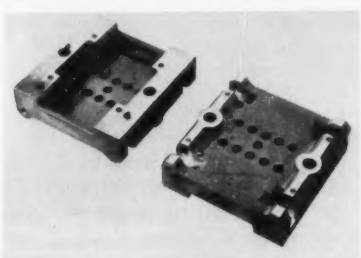
has application as a lubricant for shell molds

Nopco Chemical Co., Harrison, N. J.—Nopcowax 22-DS, an ethylene bistearamide synthetic wax, has use as a lubricant in shell molds based on phenolic resin sand mixes. The wax has a melting point of 140° C and when used at concentrations of 0.1 to 0.2 per cent of weight of the resin-sand mix, it provides a storage-stable coated sand particle and eliminates dusting and segregation in the dump box, according to the manufacturer. It eliminates the need for silicone emulsion lubricants on the pattern and increases the tensile strength of the green mold. The wax is available in powdered form (90 per cent through a 100-mesh screen).
For More Details Circle No. 406—Page 209

Ejector Box

permits die casting ejection over complete die block area

DCMT Division, British Industries Corp., Port Washington, N. Y.—Ejector box, larger and sturdier than any previous model, is available for air-operated DCMT die casting machines.



It has been machined to be interchangeable with ejector boxes in all existing air-operated DCMT machines. The new design permits ejection over the complete area of the die block, to a maximum size of 9 x 9 in., to enlarge the capacity of the machine on thin-wall, wide-area castings.
For More Details Circle No. 407—Page 209

Sulphur Titrators

are used in analyzing steel, iron, slag, ores and limestone

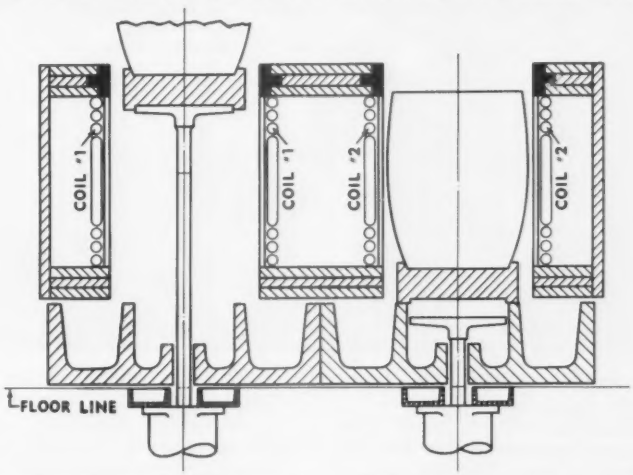
Laboratory Equipment Corp., St. Joseph, Mich.—Three new sulphur titrators are for use with the combustion-titration procedure for analyzing sulphur in steel, iron, oil, slag, ores, limestone and other materials. The line embraces an automatic model in which titration is monitored continuously by an electronic circuit, a semiautomatic model in which the operator titrates to a meter reading and a basic model wherein the color in the vessel is measured by eye.
For More Details Circle No. 408—Page 209

Ducts and Hoods

of lightweight plastic can be made to any desired shape

Ceilcote Co., 4884 Ridge Rd., Cleveland 9, O.—Corrosion-resistant ducts and hoods are made of a thermosetting plastic material. Physical properties of the material range from 11,000 to 15,000 psi tensile strength and 22,000 to 30,000 psi flexural strength, depending on thickness. Hoods can be made to any desired shape and ducts can be formed to

Push-Out Furnace Cuts Crucible Transfer Time



PUSH-OUT FURNACE reportedly offers the ultimate in production with the removable crucible principle. The unit consists of one furnace with two melting positions. The moment the charge in one position is ready for pouring, power is transferred in seconds to the second melting position and a hydraulic cylinder raises the crucible of molten metal in position number one so it can be carried immediately to molds for pouring.

This saving of two or three minutes in transfer time per crucible means extra melts per day or thousands of extra castings per year with the same generator equipment. The furnace is short, compact and occupies minimum floor space. The coils never move, eliminating flexible leads or contacts as well as a hoist for raising the coil. The furnace is manufactured by Inductotherm Corp., 412 Illinois Ave., Delanco, N. J.
For More Details Circle No. 444—Page 209

handle virtually any volume of gas at any desired pressure. Overhead ducting requires minimum support because of its light weight.

For More Details Circle No. 409—Page 209

Tooling Plastic

has been added to company's line of cements and plastics

United States Gypsum Co., Industrial Dept., 300 West Adams St., Chicago 6, Ill.—Company has added

Epoxical to its line of Hydrocal and Ultracal gypsum cements for pattern and mold making. Epoxical is a line of epoxy resins for foundry matchplates, coreboxes and pattern equipment. Material has been in use by the pattern industry for the past year, and extensive research and development has been in progress for several years. Sample trial kits for pattern shop evaluation will be supplied on request. It is available also in pints, quarts, 5-gal containers and drums.

For More Details Circle No. 410—Page 209

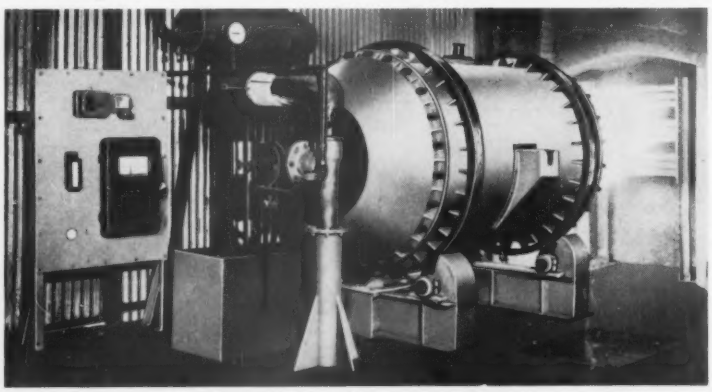
Iodine Complex

does not sting, stain or burn and washes from skin or fabric

Davis Emergency Equipment Co., 47 Halleck St., Newark, N. J.—Isodine (R) antiseptic is a new painless, nonstaining, detoxified iodine complex for D-carton and industrial first aid use. The preparation is a 10 per cent aqueous solution of polyvinylpyrrolidone-iodine (PVP-iodine) complex produced by the interaction of PVP and iodine. As a consequence of the interaction, the vapor pressure of the iodine is reduced virtually to zero, resulting in a product that does not sting, stain or burn (even when bandaged). The antiseptic can be washed from the skin and natural fiber fabrics with water.

For More Details Circle No. 411—Page 209

Rotary Furnaces Are Versatile Melting Units



ROTARY FURNACES have found acceptance in England as the melting unit to provide shell molding operations with metal of rigidly controlled composition within a range of different pouring temperatures at regular periods of the day to suit production requirements. A typical rotary furnace installation adapted to shell molding in an English foundry is shown here. Furnaces are built in cold-charge capacities of from ½ to 5 tons per charge and can be fired with a wide range of fuel oils or with creosote-pitch fuel.

Full instrumentation permits accurate control over the air-fuel ratio supplied to the burner, and controlled furnace combustion conditions assure consistent metal analyses from consecutive heats under production conditions.

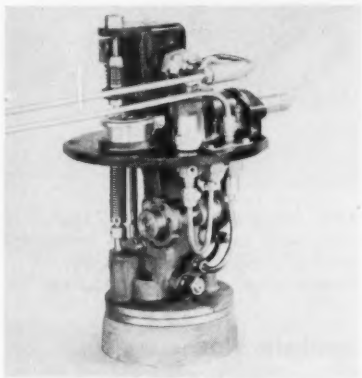
Furnaces are lined with a prepared monolithic material rammed into place around metal formers supplied with the furnace. When used for producing cast irons, such a lining reportedly gives a life in excess of 100 melts with a total refractory consumption of about 50 lb per ton of metal melted. The furnaces are made by the Monometer Mfg. Co., Savoy House, London, W.C., England.

For More Details Circle No. 445—Page 209

Automatic Lubricator

provides cyclic and continuous oiling through a double system

Bijur Lubricating Corp., 151 West Passaic St., Rochelle Park, N. J.—Single automatic lubricator is said to provide both cyclic and continuous



oil flow to different bearings on the same machine. The AP-3 lubricator is designed for machines with a dual lubrication problem such as where some bearings need periodic lubrication and others require oil continuously. Lubricator consists of two independent gear pumps with a common drive gear, mounted in a single housing. Both pumps draw oil from a common reservoir in the bottom of the housing.

For More Details Circle No. 412—Page 209

Grinding Wheels

of two types are said to possess superior strength

Electro Refractories & Abrasives Corp., 344 Delaware Ave., Buffalo 2, N. Y.—Fibreglass-reinforced resinoid grinding wheels are said to have superior strength and are supplied in two types. One is a foundry cutoff wheel available in diameters up to 20 in. The other is a depressed center type wheel that comes in 7 and 9 in. diams. Cutoff wheel can be used on steel alloys and nonferrous castings. Depressed center wheel can notch risers for knock-off, deburr, slot, clean welds or perform light snagging and clean-up operations.

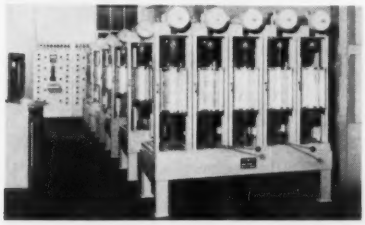
For More Details Circle No. 413—Page 209

Creep Strain Testers

of German design feature simple controls and operation

R. L. Simons, 50 Broad St., New York 4, N. Y.—Creep strain testers made by West German firm of Mohr & Federhaff feature simplicity of design and operation. Some models will handle ten samples simultaneously and one set of controls can

be made to serve a battery of as many as 50 furnaces at one time. There are two basic models: One with units in multiples of five furnaces each containing a single sample, the other model to test up to



ten samples in a single furnace. Testing temperatures range up to 1000° C. The batteries of five can be run at five different temperatures and stresses. Temperature readings are claimed accurate within 0.5° C, and the calibrations can be read instantly.

For More Details Circle No. 414—Page 309

V-Belt

is engineered for increased power transmission applications

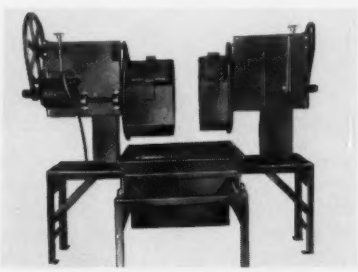
Thermoid Co., 200 Whitehead Rd., Trenton, N. J.—Powerflex Hi-Capacity V-belt is designed for applications where increased power transmission is desired with a minimum of maintenance. Belt is supplied in all standard sizes and features a special oil resistant cover to prolong belt life. The belt can be supplied with static conducting covers. A and B section belts are made with nylon laminated construction and C, D and E sections are made of heavy rayon grommet construction.

For More Details Circle No. 415—Page 209

Piggy Back Stand

positions tumblers for easy unloading to a screen separator

Rampe Mfg. Co., 14915 Woodworth Ave., Cleveland 10, O.—Piggy back stand is designed with two legs to



bolt to the frame of the Rampe screen separator. The stand supports a tumbling unit in position to unload into the separator. The stand can be used either left or right hand or two stands can be used to posi-

New trends in the use of refractories by **LACLEDE-CHRISTY**

LACLEDE-CHRISTY introduces new packaging for Refractory Specialties

For improved identification. Product and application data on Laclede-Christy's new castables, plastics, ramming mixes and bonding mortar, cartons and drums and bags are clearly visible and easy-to-read.

Improved product protection. Laclede-Christy cartons, drums and bags contain consistently high quality products securely protected during shipment and handling. Drums are sealed against weather and water.

New quality-first controls also are in effect at Laclede-Christy. They add to improved packaging as reasons why you profit by using Laclede-Christy refractory products. Your Laclede-Christy man will be glad to give you a complete report. See him soon. Laclede-Christy Division, H. K. Porter Company, Inc., St. Louis 10, Missouri.

HKP LACLEDE-CHRISTY DIVISION
H. K. PORTER COMPANY, INC.

Circle 685 on Inquiry Card—Page 209

tion two tumblers to unload into the same separator. Stands are all-steel construction.

For More Details Circle No. 416—Page 209

Laboratory Furnace

can simulate conditions in a large production furnace

Rochester Division, Consolidated Electrodynamics Corp., 1775 Mt. Read Blvd., Rochester 3, N. Y.—Laboratory arc-melting vacuum furnace which

simulates conditions in a large production furnace uses interchangeable consumable or nonconsumable electrodes and can handle high-melting-point metals as well as iron, nickel, copper and their alloys and many metallic carbides and borides. The furnace can be operated in an inert atmosphere or in a vacuum down to an ultimate of 5×10^{-4} mm Hg. It handles melts in "buttons" of a few ounces or ingots of several pounds. The water-cooled, stainless steel furnace chamber has two windows for observing the melt. The copper crucible, available in several sizes and shapes, is set in a water-cooled jacket and cannot contaminate the melt.

For More Details Circle No. 417—Page 209

Temperature Controls

are supplied in a variety of bulb styles and tube lengths

United Electric Controls Co., 79 School St., Watertown, Mass.—Remote bulb temperature control contains two switches and, in many applications, may be used in place of two separate single-switch controls. Temperature settings are made by rotating a single-turn knob and pointer against a calibrated scale. Models are available with range spans of 100 or 200° F between sub-zero and 650° F and with on-off differentials of about 1 and 2° F. A variety of bulb styles and capillary tube lengths are available. The standard tube length is six ft.

For More Details Circle No. 418—Page 209

Projection Magnifier

is suitable for inspection of flat objects and small parts

American Optical Co., Instrument Division, Buffalo 15, N. Y.—Self-contained portable projection magnifier is suited for fatigue-free inspection and examination of relatively flat objects and small parts. Two models are available—one enlarges the object material three times, the other five times. Objects to be examined are placed on a two-way movable platform. A counterbalanced optical head is lowered into contact and

the magnified image is projected onto an illuminated 4½ x 12-in. viewing screen. Over-all size of the magnifier is 13¼ x 13¼ x 21⅛ in.

For More Details Circle No. 419—Page 209

Aluminized Asbestos

permits wearer to withstand temperatures above 2500° F

Keasbey & Mattison Co., Ambler, Pa.—Kamklad, a fire protective, aluminized asbestos cloth reflects over 90 per cent of radiant heat and makes it possible for the wearer to withstand temperatures in excess of 2500° F without discomfort or ill-effect, according to the manufacturer. The material is a tightly woven asbestos cloth surfaced by a special process with a heat protective aluminum foil.

For More Details Circle No. 420—Page 209

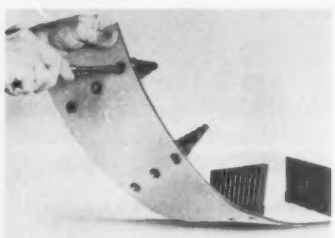
Parts Handling Boxes

will support stacked loads of from 300 to 1200 lb

Chas. Wm. Doepke Mfg. Co., 8839 Blue Ash Rd., Rossmoyne, O.—General-purpose parts-handling boxes in-

corporate same design features as company's heavy-duty boxes. Of one-piece steel construction, the new boxes come in five sizes ranging from 12 to 36 in. in length and will support stacked loads of from 300 to 1200 lb. The boxes differ from the heavy-duty containers only in that they are made of lighter gage metal and have no bottom runners. The nesting-stacking feature and double

Screw-On Cleat Designed for Conveyor Belts



MOLDED NEOPRENE screw-on cleat may be screwed onto any conveyor belt to convert that belt into a cleated belt. Operation is simple, the only tools required being a punch and a screwdriver. The neoprene cleats are attached to the belt by flat-head machine screws and special countersunk washers secured to threaded metal inserts vulcanized in the base of the cleat. Inserts are imbedded in concave cups. When screw is tightened against washer, it pulls belt into cup and both screw head and washer sink below surface of belt, where they cannot contact pulley.

Molded of long-life, high-tensile neoprene, the cleats are resistant to oil, heat, mild acids and weather conditions. Cleats are available from stock in heights from ⅝ to 3 in., in widths from 1½ to 24 in. Unusual widths, heights and rib structure may be manufactured to specifications. The cleats are manufactured for T. H. Hinchcliffe, 1450 La Loma Rd., Pasadena 2, Calif.

For More Details Circle No. 446—Page 209

MELTRITE PIG IRON

Strictly Merchant

Great productive capacity. Entire production for sale at all times. Strategic location of the plants. Quality of product. These are but four reasons why *more* MELTRITE is used than any other merchant pig iron.

MELTRITE is made to the required analysis for the particular need. Specifications are met for many different grades.

SERVICE DEPARTMENT AVAILABLE WITHOUT OBLIGATION

Serving Industry Since 1883

PICKANDS MATHER & CO.
CLEVELAND 14, OHIO
Chicago • Cincinnati • Detroit • Duluth
Erie • Greensboro • St. Louis • Washington

IRON ORE • PIG IRON
COAL • COKE • FERROALLOYS

Circle 686 on Inquiry Card—Page 209

hopper design permit handling parts throughout the plant in the same container.

For More Details Circle No. 421—Page 209

Emergency Light Unit

operates automatically when normal power supply fails

Exide Industrial Division, Electric Storage Battery Co., Box 8109, Philadelphia 1, Pa.—Emergency lighting unit operates automatically and instantaneously during failure of normal power and features an automatic charging device that requires only minimum battery maintenance. Immediately following an emergency discharge, the unit automatically recharges its storage battery at a high rate and then follows at a trickle rate to maintain itself in a state of constant readiness. Colored pilot balls tell at a glance the approximate state of charge. Standard model A units have one 25-w, sealed-beam lamp, directionally adjustable, mounted on the case. One additional lamp can be mounted on the case or two additional lamps can be connected remotely to light adjacent areas.

For More Details Circle No. 422—Page 209

Vacuum Arc Furnace

is for melting molybdenum and molybdenum alloys

General Electric Co., Industrial Heating Dept., Shelbyville, Ind.—Twelve-inch capacity vacuum arc melting furnace is for melting molybdenum, molybdenum alloys, iron and nickel base alloys, titanium and zirconium. Furnace reportedly eliminates impurities from the atmosphere and also removes gaseous impurities at melting temperatures, reduces segregation and produces a superior grain structure. The unit will handle 8, 10, 12 and 16 in. diam ingots with a maximum length of 66 in. and

MILWAUKEE COKE SOLVAY

Highest Quality Foundry Coke

MILWAUKEE SOLVAY is highest quality coke—and has been for over 50 years—because it is made only from carefully selected coal purchased for one reason—to make the *best* foundry coke.

Resistant to shatter and abrasion, high in carbon and low in sulphur and ash, MILWAUKEE SOLVAY is screened to the correct size for your requirements. It is always in dependable supply.

SERVICE DEPARTMENT AVAILABLE WITHOUT OBLIGATION

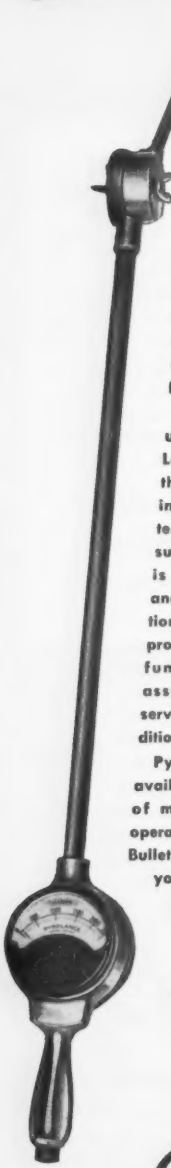
Serving Industry Since 1883

PICKANDS MATHER & CO.
CLEVELAND 14, OHIO
Chicago • Cincinnati • Detroit • Duluth
Erie • Greensboro • St. Louis • Washington

IRON ORE • PIG IRON
COAL • COKE • FERROALLOYS

Circle 687 on Inquiry Card—Page 209

in nonferrous foundries SURFACE INDICATIONS CAN BE MISLEADING



To accurately measure temperature of molten, nonferrous metals, readings should be made *below* the surface.

Portable, handy to use, the Alnor Pyro Lance has a protected thermocouple mounted in the lance tip—it takes temperatures below the surface, where accuracy is unaffected by dross and other surface conditions. Enclosed couple is protected against flame, fumes, and corrosion, assuring long, accurate service under severe conditions.

Pyro Lance models are available for a wide variety of metals and foundry operations. Write today for Bulletin 1724-D and see how you can have low-cost quality control in your foundry. Illinois Testing Laboratories, Inc., Room 511, 420 North LaSalle St., Chicago 10, Illinois.

Alnor

PRECISION INSTRUMENTS FOR EVERY INDUSTRY

Circle 689 on Inquiry Card—Page 209

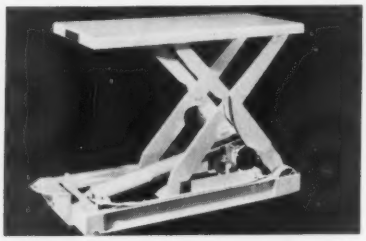
weighing from 850 to 5000 lb. Furnace will produce a 2000-lb ingot every five hours. This includes about two hours melting time, one and one-half hours for ingot removal and one and one-half hours for preparing furnace for the next melt.

For More Details Circle No. 423—Page 209

Portable Lift Table

is designed to elevate loads weighing as much as 4000 lb

Southworth Machine Co., Portland, Me.—Lift table is designed to elevate skid or palletized loads to correct feeding, working and positioning heights for a variety of machine, process or assembly operations. Platform dimensions are 24 x 53 in. Collapsed height is 7¼ in. Capacity is 4000 lb with a stroke or lift of 30 in. The table is powered by a ½-hp, single phase, 115 v ac, 60 cycle, 1725 rpm motor. Lift is controlled by an electrohydraulic pump with built-in relief and solenoid valves. Stationary models also are available in a variety of table sizes.

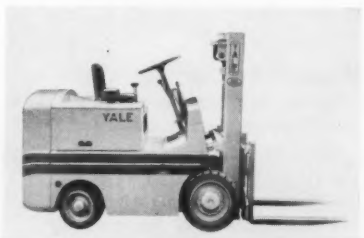


For More Details Circle No. 424—Page 209

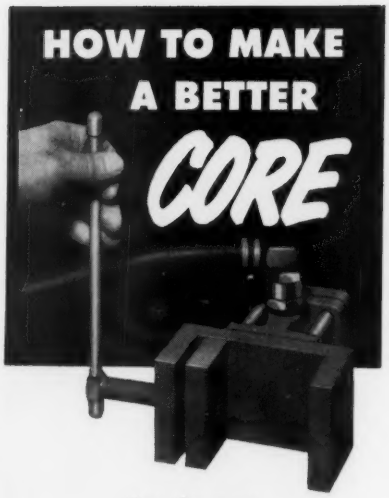
Industrial Lift Truck

is protected against harmful effects of abrasive dust

Yale & Towne Mfg. Co., 11,000 Roosevelt Blvd., Philadelphia 15, Pa. —Dust-protected, gasoline - powered industrial lift truck is engineered to provide trouble-free material handling in locations containing atmospheric abrasives. A tandem air cleaning system filters air going into the carburetor. Oil filter is a heavy-duty type with an air filter on the crankcase breather pipe. Bottom of the truck is protected by a deflector



HOW TO MAKE A BETTER CORE



Use the new Cleveland VG 2 Core Box Vibrator.

ELIMINATE SLEDGING
INCREASE CORE PRODUCTION
DRAW FASTER AND CLEANER
NO CORE DISTORTION
SAVE CORE BOXES

Designed specifically for large core drawing, this portable vibrator develops 8000 Vibrations per minute, adjustable for varying core sizes. Now in stock in Cleveland and San Francisco.

$78.20 FOB Cleveland

Bin Stuck Lately?

THE CLEVELAND VIBRATOR COMPANY

2788 Clinton Ave. • Cleveland 13, O.

Circle 690 on Inquiry Card—Page 209

plate. Generator and voltage regulator are enclosed for preservation of commutator surfaces and extended brush and contact life.

For More Details Circle No. 425—Page 209

Interchangeable Faces

are said to make vises work better and last longer

Wilton Tool Mfg. Co., Schiller Park, Ill.—Manufacturer says that interchangeable jaw faces, made in varying degrees of hardness, help make machinist's vises work better and last longer. Faces are made in five different materials: Steel, diamond serrated, hardened; steel, smooth, hardened; steel, smooth, soft;

brass or copper, smooth; and plastic fiber, smooth. Universal brass and copper jaw caps are available to fit over any of the steel or fiber jaw faces. When jaw faces are changed to suit the job, the full gripping force of the vise can be applied to all work, without danger of slipping, damage to the work piece or needless wear.

For More Details Circle No. 426—Page 209

Dust Collectors

have been redesigned to increase their storage capacity

Torit Mfg. Co., Dept. KP, 287 Walnut St., St. Paul 2, Minn.—Series 80 cabinet cloth-filter dust collectors have been redesigned to increase their storage capacity from ¾ to 2 cu ft. Each of the collectors has 150 sq ft of cloth filtering area, with filters made from fine-woven cotton, chemically treated for spark resistance. Each cabinet measures 28 x 28¼ x 49¼ in. Internally mounted motors and fans move from 580 to 1100 cfm of air through the filters at speeds of 5000 to 8000 fpm.

For More Details Circle No. 427—Page 209

Vacuum Cleaner

fits any 55-gal drum for volume wet or dry cleaning

Hild Floor Machine Co., 740 West Washington Blvd., Chicago 6, Ill.—Model 655 industrial vacuum cleaner

Increase ladle life

...with J-M 3X Blazecrete® the hydraulic setting refractory

You can make longer lasting linings for ladles with J-M 3X Blazecrete, because it is spall-resistant, withstands slagging action and has negligible shrinkage.

3X Blazecrete . . . the 3000F refractory . . . is easily and quickly applied . . . mix with water like ordinary concrete, and slap-trowel to desired thickness. Hardens without application of heat. Contains no harmful irritants . . . safe even for hand application. 3X Blazecrete is furnished as a dry mix, and may be stored indefinitely without deterioration.

You'll also find 3X Blazecrete ideally suited for forming run-out spouts and for gunning parts of iron cupolas.

Send for free brochure on Blazecrete (RC-28A) describing its properties and uses. To obtain your copy—as well as additional application details—write Johns-Manville, Box 14, New York 16, N. Y. In Canada, 565 Lakeshore Road, Port Credit East, Ontario.

Whether you gun it... *or slap-trowel it...*

JOHNS-MANVILLE JM PRODUCTS **Johns-Manville BLAZECRETE**

BUILDS BETTER REFRACTORY LININGS

an ACCO product
Acco Registered® Sling Chains
NEW!
Shaped Section Master Link
Holds its form under loads up to 18% greater.
NEW!
Accoloy X-Weld 125 Chain
Welds as strong or stronger than alloy material. Welded area 2¼ times conventional size area.
*Pat. No. 2763768

New X-weld Chain and New Master Link give added strength, safety!

• The best has been made even better! ACCO *Registered* Sling Chains, recognized everywhere as the finest sling chains on the market, have now been made still stronger and safer by incorporating ACCO's great new Accoloy X-weld 125 chain and ACCO's new Shaped Section Master Link.

The Accoloy X-weld 125 chain is non-kinking. Each link has an oversize welded area with welds of full alloy strength. This means extra ruggedness and longer service life. Chain is identified at 5-foot intervals by tape markers reading "ACCO X-Weld Pat. No. 2763768." The new Shaped Section Master Link weighs no more, but it withstands deformation under loads up to 18% greater than a conventional round section can.

Next time you buy sling chains, get ACCO *Registered* Sling Chains—they are better than ever! For full details, call your ACCO *Registered* Distributor—or write our nearest District Office.

WHAT "ACCO REGISTERED" MEANS

1 The best material
2 Unit safety factor (on bodies, rings, links, hooks)
3 Proof test of complete sling to twice the working load limit
4 Actual field service test of each design
5 Metal identification ring on each sling
6 Signed Registry Certificate with each sling

ACCO
American Chain Division
AMERICAN CHAIN & CABLE
York, Pa., Atlanta, Boston, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn.
TRADE MARK
plus Rings Links Hooks

features two 1 1/3-hp motors with a new propeller design. The cleaner fits any 55-gal drum, and the vacuum unit can be transferred quickly from drum to drum to speed heavy-

volume wet or dry cleaning. The cleaner can be used with one or two motors depending on the job. Each motor can be detached for use as a portable blower.

For More Details Circle No. 428—Page 209

Lubrication System

centralizes all grease fittings at one point for easy contact

Lincoln Engineering Co., 5702-31 Natural Bridge Ave., St. Louis 20, Mo.—Centralized lubrication system groups all grease fittings at one point for easy contact. It consists of one or more manifold blocks threaded for insertion of standard hydraulic grease fittings. Blocks are bolted to an accessible location on a machine unit. Rigid or flexible feed lines connect bearings to inlet ports of the manifold blocks. Fittings can be contacted by any standard manually or power-operated application device, as lever guns, bucket pumps or power lubricators. The manufacturer claims the simplicity of the system makes installation a quick and easy job with no special preparation necessary and no special tools to buy.

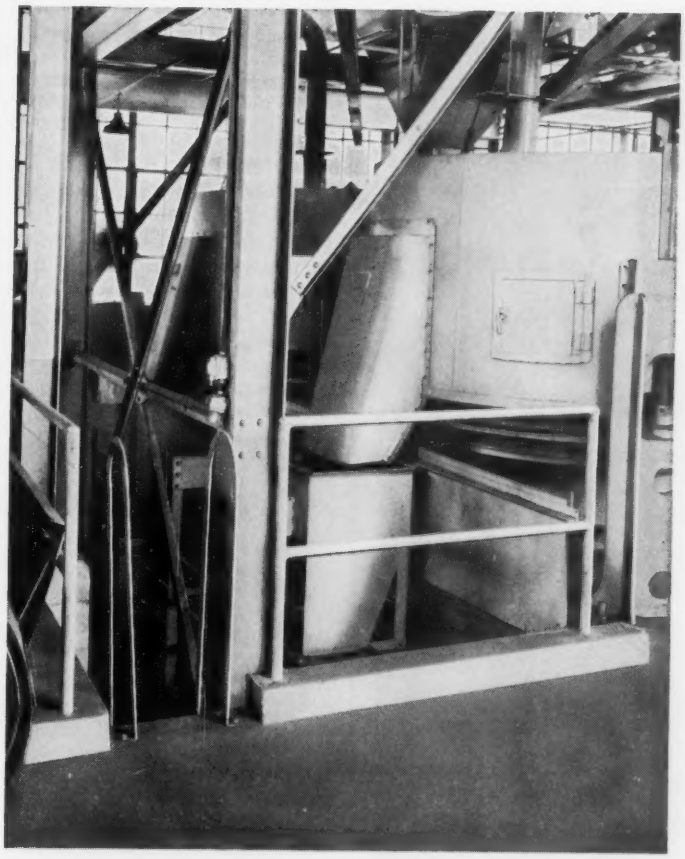
For More Details Circle No. 429—Page 209

Roof Ventilators

are of low-silhouette design with capacities up to 938 cfm

Ilg Electric Ventilating Co., 2850 North Pulaski Rd., Chicago 41, Ill.—Three low-silhouette sizes have been added to company's roof ventilator line. Models range in height from

THE *Clearfield* MIXER



gives *consistent uniformity* in your sand

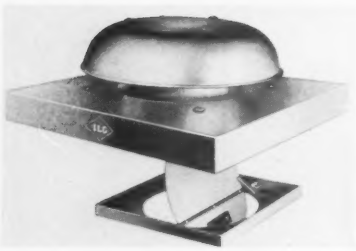
Automatic time controls on the Clearfield Mixer permit the use of a predetermined, uniform procedure without depending on the human element. This gives you precise control over length of tempering, quantity of bond, and all other factors—you don't have to mix sand by your operator's "instinct". The result is consistent uniformity . . . the Clearfield way. These controls may be added to any Clearfield Mixer.

Write today for Catalog No. 83. See what we mean by "A Clearfield Mixer for every need!"

CLEARFIELD MIXER mixes, tempers, aerates

CLEARFIELD MACHINE COMPANY

Clearfield, Pennsylvania, U. S. A.



6¾ to 12¾ in. Capacities range from 287 to 938 cfm. Motors are shaded pole type, totally enclosed with permanently lubricated bearings. The new sizes extend the Type LSQ line of ventilators to eight low and high-speed models to meet a variety of ventliating needs.

For More Details Circle No. 430—Page 209

Single Eye-Piece Goggle

affords maximum safety and comfort to the wearer

Fibre-Metal Products Co., Chester, Pa.—Single eye-piece goggle, called the Solo Goggle, is designed to use standard 2 x 4¼-in. filter lenses and cover glass and to fit over the largest safety or personal prescription glasses. Lenses are held by a single spring attachment and require no tools for replacement. The goggle is supplied with head rest for pressureless close-to-face fit or for ventilated off-the-face wear. The sweatband-fitted headband has wide range head adjustment. It also is available with an adjustable elastic headband.

For More Details Circle No. 431—Page 209

"...if it's Miller you know it's the finest..."

Wherever industry exploits the greater profit possibilities of arc welding processes, Miller selenium rectifier type dc welders have earned re-order respect.

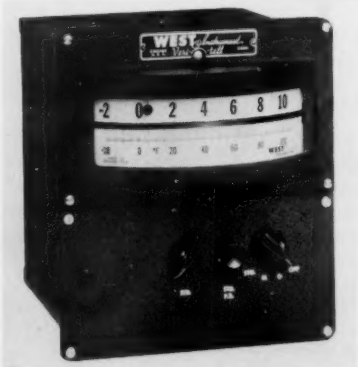
Adapted by design to widest range of specialized and automatic applications, the Miller SR series is offered in single or duplex models of from 200 to 1200 amperes with 60% duty cycle ratings. Lowboy units (27½" high) for stacking.

miller ELECTRIC MANUFACTURING CO., INC.
APPLETON, WISCONSIN
distributed in Canada by CANADIAN LIQUID AIR CO., LTD. Montreal

Indicators and Controllers

use wheatstone bridge principle with a resistance bulb

West Instrument Corp., 4363 West Montrose, Chicago 41, Ill.—Resistance thermometer indicators and controllers use the wheatstone bridge principle with a resistance bulb which varies in resistance according to temperature. A full line of single and multipoint units is available in standard and double scale ranges from sub-zero to 500°F. Accuracy to ½ per cent of range is reported. The resistance bulb sensing unit may be as much as 1000 ft from the indicator, and calibration need not be changed with lead length.



For More Details Circle No. 432—Page 209

Vacuum Pumps

are available in six sizes from 1000 to 12,000 cfm

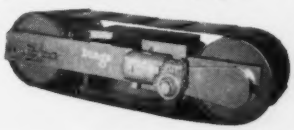
NRC Equipment Corp., subsidiary of National Research Corp., 160 Charlemont St., Newton Highlands 61, Mass.—Series 4700 mechanical booster vacuum pumps are available in six sizes from 1000 to 12,000 cfm and operate at top capacity through-

What You Can Do To Cut Production Delays

- *Stop Downtime Caused by Tramp Iron Damage*
- *Reduce Sand Preparation Costs*
- *Speed Handling of Scrap, Pig Iron, Hot Castings*

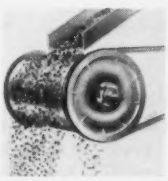
ARE production delays taking a big bite out of your profit? By using modern magnetic separation techniques, foundrymen are holding slowups . . . and thus production costs . . . to the minimum.

There are three good ways to reduce production delays. *First*, cut downtime caused by tramp iron damage to machines and equipment.



Dings "In-Line" Self-Cleaning Rectangular Magnets automatically pull iron out of the deepest burdens on high-speed belts. Extraction of iron is parallel to belt travel and at the same speed, permitting removal of long pieces before the trailing edge can rip the belt.

Second, use Dings non-electric Perma-Drums for low-cost removal of iron from sand in locations where other types of magnetic separators are impractical . . . below chutes or spouts, and in sand preparation equipment. Use Perma-Drums also for final removal of small iron fragments that may get by the first separation of shake-out sand, and thus delay production.



Third, you can save manpower and speed the handling of scrap, hot castings, charging cupolas, or moving pig iron. Dings cool-running Lifting Magnets can be profitably used wherever a dependable, long-lasting "weight-lifter" is needed.

Other Dings Magnetic products can help you save wasted time and money in your foundry. For details, write to

DINGS MAGNETIC SEPARATOR CO.
4708 W. Electric Ave.
Milwaukee, Wis.

ML-257½

Circle 695 on Inquiry Card—Page 209

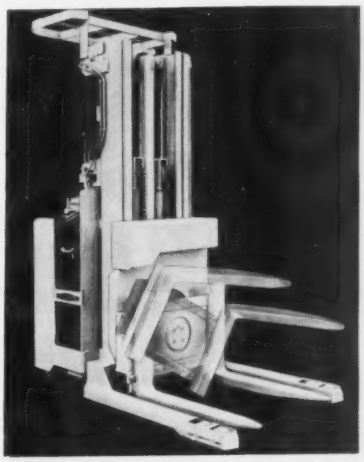
out the broad pressure range of 5 to 2200 microns. Pumps use no oil, either as a pumping medium or as a sealant, in the system. That makes backstreaming impossible, assures clean systems and removes risk of spoiling process materials.

For More Details Circle No. 433—Page 209

Revolving Fork Truck

has forks that can move in a continuous 360 degree arc

Raymond Corp., 65-147 Madison St., Greene, N. Y.—Revolving fork electric truck permits dumping of small parts from steel boxes into



hoppers or, when the forks are in normal position, the truck can be used to stack boxes in storage areas or perform other material handling operations. The forks can move in a continuous 360-degree arc in both clockwise and counterclockwise directions. Movement is controlled by a hand-operated hydraulic valve. The device can be installed on any 4000-lb capacity straddle truck made by Raymond.

For More Details Circle No. 434—Page 209

Drill Press

offers many special features as well as standard ones

Delta Power Tool Division, Rockwell Mfg. Co., 468 North Lexington Ave., Pittsburgh 8, Pa.—Versatile and low-cost 14-in. drill press for commercial wood and metalworking shops offers many special features in addition to standard ones. Special features include: Streamlined, full-length belt guard hinged at rear and counterbalanced; pivoting motor mounting plate; quill allowing 4 5/16-in. spindle travel; side opening to facilitate spindle removal; easy-to-operate spindle return tension adjustment which allows operator an in-

for FASTER MOLDING and UNIFORMLY SOUND CASTINGS

Cleveland CHAPLETS

● Cleveland Chaplets provide you positive core support with the convenience of uniform stem and plates to speed molding. You'll find that their improved break-off design also reduces handwork to speed cleaning. You'll like the convenience of Cleveland service, too!

Delivery without delay!

PRECISE CORE SUPPORT

Sand packs tight through open coil for rigid support in mold.

OPEN COIL HEAD RADIATOR

DIMENSIONALLY UNIFORM

Uniform stems simplify molding, prevent annoying sand break-outs.

SQUARE HEAD RADIATOR

EVENLY TINNED for CONTROLLED FUSION

Even tinning over clean metal gives uniform fusion for core support during critical stage.

DOUBLE-HEAD MOTOR CHAPLET

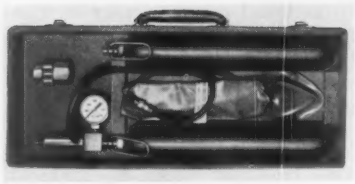
Write today for sample and catalog!

Cleveland Since 1890
CHAPLET & MFG. CO.
26471 LAKELAND CLEVELAND 23, OHIO

Circle 696 on Inquiry Card—Page 209

finite choice of tensions within a given range; work table with clamping ledges at sides and with slots to facilitate clamping.

For More Details Circle No. 435—Page 209



Oxygen Inhalator Kit

is portable but completely equipped for emergencies

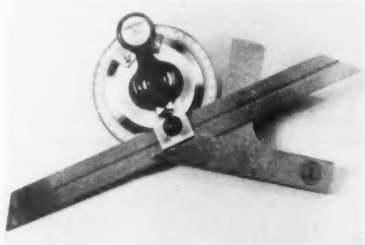
Safety Division, Davis Emergency Equipment Co., 45 Halleck St., Newark 4, N. J.—Portable oxygen inhalator kit contains complete equipment for the safe, effective administration of oxygen, including two cylinders containing a half-hour's supply of oxygen. The apparatus is so light and so easy to operate it can be used on a patient while he is being carried on a stretcher. With the regulator preset for normal breathing, it is necessary only to turn on the cylinder valve to begin oxygen therapy. Rate of flow can be adjusted to the patient's breathing, thus conserving the supply of oxygen.

For More Details Circle No. 436—Page 209

Bevel Protractor

has an adjustable magnifier to make reading easier

George Scherr Co., 200 Lafayette St., New York 12, N. Y.—Bevel protractor is equipped with an adjustable magnifier to make reading easier and more accurate. To eliminate glare, the measuring dial has a special finish which also protects the surface from corrosion. Tool will measure any angle to 5 minutes and comes regularly with a 6-in. blade. Additional accessories are 8 and 12-in. blades, acute angle attachment and a stand.

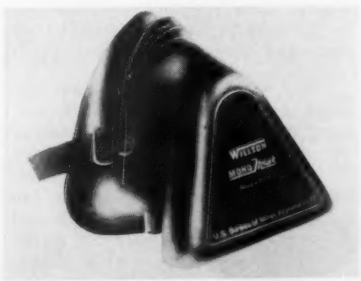


For More Details Circle No. 437—Page 209

Dust Respirator

is government-approved for protection against dusts

Willson Products Division, Ray-O-Vac Co., Reading, Pa.—No. 600 MonoMask is government-approved for protection against dusts, pneumonoconiosis-producing mists and chromic acid mist. One-piece construction and smooth contour of the facepiece simplify cleaning the respirator. The respirator uses a single filter of treated felt and has no metal parts to dent or scratch and no exposed plastic parts. Headband is attached to the front of the facepiece;



KEEP COLD OUT . . .

HEAT IN!

Use

MABCO-THERM 23-IS
(Carbon-Free) Riser Compound

It's the savings in metal and time which make the difference with Mabco-Therm (carbon-free) Riser Compound. Metal in riser stays molten long enough to give you sound, durable castings with little effort and few flaws.

Here are the Facts . . .

- ***Keeps grey iron and steel in risers molten longer — Less time for cleaning and less waste***
- ***Makes possible smaller feeder opening — Cuts cleaning costs***
- ***Exothermic Reaction produces an extremely high temperature — Requires less metal in riser***
- ***Controlled insulation qualities — Keeps riser open and heat in***

Write today for literature . . .

M. A. BELL CO.
217 Lombard - St. Louis 2, Mo.
5802 Colfax - Houston 20, Tex.
"Serving the foundry industry over 30 years"

210RA Chaps. Complete frontal protection waist to foot. Two leather straps around back of leg with full circle construction at leg bottom. Aluminized Duck — 210RD

It reflects 90% of radiant heat . . . weighs less than 50% of regular asbestos with good abrasion resistance . . . but above all it keeps workers cooler, more comfortable, more efficient! These are the big advantages of American Optical Aluminized Clothing. What's more coating resists peeling or cracking and under normal conditions provides excellent service.

American Optical Aluminized Asbestos clothing is recommended for protection against high heat (including direct radiation), sparks and molten metal splashes in cupola and ladle pouring, open hearth, blast and electric furnace tapping and similar exposures. (American Optical Aluminized Duck is recommended where exposures are basically radiant heat.) Available in jackets, coats, pants, chaps, aprons, spats, leggings, sleeves, cape sleeves, overalls, coveralls, hoods, gloves, mittens. Your nearest American Optical Safety Products Representative can supply you.

1481RA Spring Type Legging. A best seller because no adjustments are necessary. Easy on, easy off! Spring steel frame does double job — protects leg, provides air insulation area between leg and legging. Chrome tanned leather flare with spring clip. Aluminized asbestos on upper part. Aluminized Duck — 1482RD.

7X160RA Legging and 7X161RA Spat. Another popular legging because of unusual design. Spring clip on chrome tanned flare. 3 positions at top and 2 at ankle for steel stay provide snug fit, quick release. Upper part aluminized asbestos. Aluminized Duck — 7X160RD and 7X161RD.

204RA Coat. Completely protects upper body Wool collar protects neck. Snap fasteners on cuffs for snug fit. All snap fasteners on front have leather-pull tabs for quick removal. All seams double-stitched. Six standard coat lengths. Aluminized Duck — 204RD.

10RA Sou'wester and 1X115 Cowl Hoods. 10RA (Sou'wester type with permanently attached bib) provides ample protection to head and neck. Bib has one-piece lookout of clear glass 2" x 4¼". 3 sizes. Cowl hood has snap fastener adjustment. 3 cowl sizes. Aluminized Duck — 10RD and 1X117.

Always insist on Trademarked Safety Products

American Optical
COMPANY
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

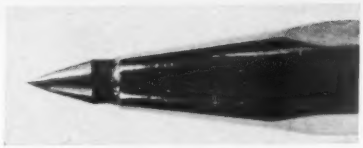
positive action inlet and outlet valves insure uninterrupted ease of breathing. The unit can be worn with spectacles or goggles.

For More Details Circle No. 438—Page 209

Scribing Tool

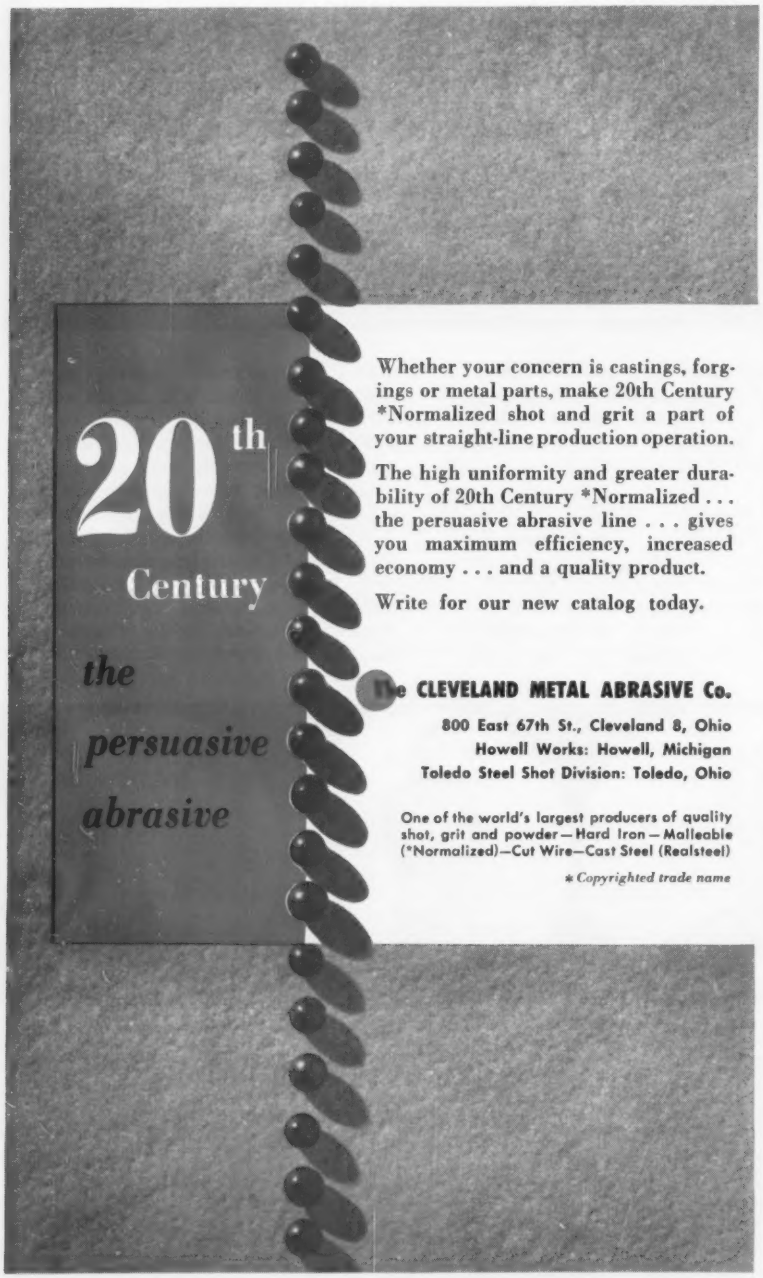
can be used to scribe or etch all kinds of metals

Greist Mfg. Co., New Haven 15, Conn.—Micro-Scriber, a lightweight tool with a solid carbide tip, is designed for faster layout, scoring, etching, engraving and marking in



toolrooms, machine tool repair shops, sheet metal shops and pattern shops. It can be used to scribe or etch all metals. The carbide tip is secured within the tool and is mounted in a polished aluminum handle, hexagonal in shape so it won't roll.

For More Details Circle No. 439—Page 209


20th Century
the persuasive abrasive
Whether your concern is castings, forgings or metal parts, make 20th Century *Normalized shot and grit a part of your straight-line production operation.
The high uniformity and greater durability of 20th Century *Normalized . . . the persuasive abrasive line . . . gives you maximum efficiency, increased economy . . . and a quality product.
Write for our new catalog today.
The CLEVELAND METAL ABRASIVE Co.
800 East 67th St., Cleveland 8, Ohio
Howell Works: Howell, Michigan
Toledo Steel Shot Division: Toledo, Ohio
One of the world's largest producers of quality shot, grit and powder—Hard Iron—Malleable (*Normalized)—Cut Wire—Cast Steel (Realsteel)
* Copyrighted trade name

Fluid Gear Compound

is for heavily loaded, open and semiopen type gears

Bel-Ray Co., Dept. 103, Madison, N. J.—Molylube fluid gear compound Type A has been formulated for heavily loaded, open and semiopen type gears. It is said to have excellent adhesive and cohesive properties and will prevent scoring, galling and pitting. The compound does not require heating, is water resistant and not adhesive to dust.

For More Details Circle No. 440—Page 209

Locker Rack

accommodates ten persons in a minimum of floor space

Lyon Metal Products Inc., Aurora, Ill.—Locker floor rack accommodates ten persons in minimum floor

space with all compartments at a convenient height. Unit is portable. Each door is equipped with built-in lock with two keys. Patented coat hanger and chain arrangement permit coats and jackets to be locked to rack. Finished in gray baked-on enamel, the units are 18 in. deep, 50 in. wide and 76 in. high.

For More Details Circle No. 441—Page 209

Shuttle Valve

can be used for air or certain types of liquids

Ross Operating Valve Co., 107 East Golden Gate Ave., Detroit 3, Mich.—Shuttle valve is available in ¼ and ⅜-in. pipe sizes with envelope dimensions of 1¼ and 2⅜ in. long, respectively. With two inlets and one outlet, the brass unit can be used for air or certain types of liquids. Valve weighs 14 oz and has a differential sealing pressure of 15 psi and operating pressure of 15 to 125 psi. The temperature range is up to 175° F.

For More Details Circle No. 442—Page 209

Alloy with a Reputation

ALMAG 35

for highest purity available in aluminum alloys... As with any product of highest quality reputation, attempts are constantly made to equal the outstanding characteristics of Almag 35. Almag 35 cannot be duplicated by others because it is fully protected by patents.* Claims for equal or similar properties are false.

We do not take our patent responsibility lightly. No other aluminum alloy has ever been subjected to such rigid research and testing as Almag 35. Our purposes are to improve and refine, if possible, the outstanding properties Almag 35 has for high strength, ductility, dimensional stability, high shock and corrosion resistance.

Very shortly we hope to present to the trade another series of improvements in light metal alloy properties which may well change the standards for these metals in all classifications.

*U.S. Patents Nos. 2564044, 2583473, 2628899, 2733991 and 2764482.

Our 51st Year in Aluminum Alloys

WILLIAM F. JOBBINS, INCORPORATED

P. O. BOX 230 • AURORA, ILLINOIS

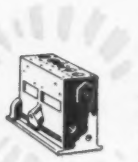
Circle 700 on Inquiry Card—Page 209

NARCOLINE

Slag-Resistant Plastic Refractory

NARCOLINE NARCOLINE NARCOLINE

NARCOLINE
Assures Cleaner Castings



It successfully resists the erosive and corrosive action of metals and slags, eliminating refractory inclusions from the casting.

NARCOLINE
Facilitates Metal Flow

It resists graphite burnout under operating conditions, and maintains a lasting fabricated surface for easy metal flow.

NARCOLINE
Assures Easy Slag Removal

It resists the wetting action of molten metal and slag, permitting ladles to be cleaned of solidified metal and slag with little effort.

NARCOLINE
Easy to Install

It can be rammed to any desired shape with mallet or air hammer. Requires no special training to install.

Send for bulletin No. 106 Rev.

NORTH AMERICAN REFRACTORIES CO.
General Offices, Cleveland 14, Ohio
DISTRICT SALES OFFICES:
50 Church Street, New York 7, N. Y.
906 Blue Cross Bldg., Philadelphia 2, Pa.
89 Broad Street, Boston 10, Mass.
703 Ellicott Square Bldg., Buffalo 3, N. Y.
1439 Oliver Building, Pittsburgh 22, Pa.
420 Curtis Building, Detroit 2, Michigan
59 E. Van Buren Street, Chicago 5, Ill.
606 Terrace Plaza Bldg., Cincinnati 2, Ohio
NORTH AMERICAN REFRACTORIES, LTD.
191 Victoria Ave., South, Hamilton Ontario

What You Should Look for When Ordering New Parts

Checklist Covers 15 Points Vital to Parts Replacement

By Ernest W. Fair

A DAY-IN and day-out problem of foundry executives is the job of ordering parts for the many types of machinery and equipment in their plants. The wisdom with which each such order is placed can determine not only fine departmental budgetary operation, but also future performance of that machinery and equipment.

Haphazard ordering of parts always means trouble. Failure to secure maximum value for minimum expenditure also is a waste of money. Recognizing these plain facts we have compiled a list of the important points to follow in ordering parts. They derive from suggestions of supervisors, purchasing agents, parts manufacturers, suppliers and engineers.

1. If other factors permit, order replacement parts from the original manufacturer of the unit. In most instances, this course is the easiest and safest, but under some circumstances another may be more practical. For example, many component parts are made by outside firms and sold to the manufacturer of the end product. These same parts, under other brand names, often can be obtained elsewhere.

2. Be sure of the integrity of the supplier. Actually his integrity may be of more importance than that of the manufacturer. If a supplier lacks integrity, we had best place our orders elsewhere, for we usually must look to him to correct any mistakes, secure replacements, etc.

3. Are better replacement parts than the original ones available? A given part may be quite satisfactory, but still not the best on the market.

4. Apply the useful-life yardstick to every part ordered. We use it in buying new equipment, and it is equally important in purchasing parts. The actual cost of a unit in terms of its useful life—i.e., the cost per year of use—long has been recognized as a fine yardstick by which to measure purchases. It can be applied equally well in parts replacement. A given manufacturer's part which costs a few cents more than another's may be the best buy in the long run.

5. Know something of the mate-

Double Insulex
BELTS
withstand
HEAT!

because . . .

The cover of extra heavy asbestos fabric is separated from the body of the belt by two layers of insulating compound, and stitched with burn-proof asbestos cord. These belts have satisfactorily carried loads in the 700° range.

A Double Insulex Belt may have a place in your plant.

Write to
C. R. DANIELS, INC.
DANIELS, MD.

for your free 32 page booklet on Dandux Belting

INNER-SEWED DANDUX BELTING LOCK-STITCHED

offices in principal cities
New York Buffalo
Chicago St. Louis
Philadelphia Dayton
Pittsburgh Detroit
Cleveland

rials which go into the parts being purchased.

6. What about delivery? How does each supplier deliver, and in what containers? What protection is provided for threads, sharp edges, etc., which are important to the immediate, efficient use of each part?

7. Is the part under consideration the only one that should be ordered at this particular time? It pays to check all other parts with which the one under consideration does its job. One or more of these may be close to breakdown, or tolerances and other factors of efficiency may be low. As a result, expensive breakdown and reassembly soon may have to be repeated or efficiency of the new part may be reduced.

8. Is there any price advantage to buying more than one of the parts you need? Additional parts often can be purchased at less cost than a single one.

9. When ordering other than original manufacturers' parts for replacement, be certain that every specification is the same. Delays in securing correct parts replacement after delivery of a part which will not work properly can create serious problems.

10. Make certain that all pertinent information is given correctly when any parts order is placed, no matter who the supplier may be. Often a parts number is all that is needed, but it is safer to provide the trade listing by name and description, name and model number of the unit of machinery or equipment on which it is to be used and any other data we believe may be important.

11. Be certain you have on hand proper accessories with which to make the installation of the part.

12. Compare listed prices with actual delivered prices on heavy parts and unit replacements. This is particularly important where such parts are to be shipped long distance. Price comparison always should be on the basis of delivered cost.

13. Be sure the individual ordering the part knows what he is doing. Suppliers point out that most instances of errors occur at this spot. It always pays to check and recheck every parts order for specific detail and specification before placing it.

14. When a part really is needed in a big hurry, check into the speediest and safest method of securing delivery and specify this routing on the order. Suppliers cannot always have such information at hand, or the information they have may be outdated. Many suppliers tell us that delivery always could be made from one to three days earlier (particularly to out-of-the-way places) if such routing is specified by the buyer.

15. Where parts orders can be grouped, decided savings in transportation cost usually can be obtained. When one part is needed immediately, a checkup often reveals the early need for additional parts. Combining such orders can add up to worthwhile transportation savings.

Improved Quality Stimulates Sale of Cast Iron Soil Pipe

Improved quality stimulated sales of cast iron soil pipe in 1956, according to the Cast Iron Soil Pipe Institute. Despite growing use of lighter weight pipe, the decline in 1956 tonnage shipments was only one-third that in the number of housing starts.

The institute credits its standardization program, which eliminated substandard materials, with improving pipe and fittings to the extent that in some types of buildings a lighter weight product has been used successfully. Failure of nonmetallic substitutes for house sewers also has stimulated iron pipe sales in the replacement market.

Book Review

Life on Two Horizons, by John Sonnenfeld, cloth, 154 pages, 5 x 8 in., published by Vantage Press, 120 West 31st St., New York. Price $2.75.

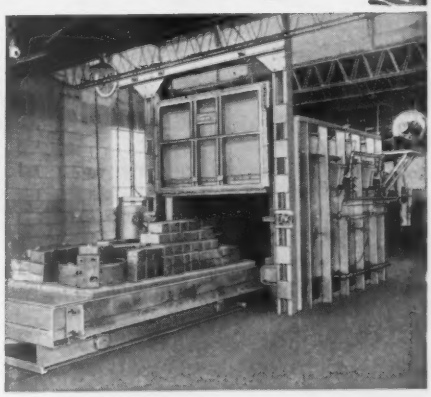
This is the interesting story of a wandering foundryman. It starts with his boyhood days in Visoka, Bosnia, and provides an enlightening and humorous description of the life of youth in the old Austro-Hungarian Empire. The author's urge for wandering came early, and he found much to provide amusement as well as experience when as a youth he worked in steelworks near his home and in northern Italy. Later he attended a technical college in old Vienna, where life was exciting.

Following a turn in the army, since all physically fit young men between 18 and 21 had to serve a period of three years, Mr. Sonnenfeld went to England and then to Belgium where he gained foundry experience. Then he came to America and over many years has worked in a number of foundries. Some jobs, he mentions, came through advertisements in FOUNDRY.

It is an interesting story of one man who moved around a great deal and found much of interest wherever he went.

For Normalizing, Annealing and Stress Relieving

JOHNSTON CAR BOTTOM FURNACES



Engineering experience is apparent in the smooth operation of the Johnston Car Bottom Furnace. Roller bearings in car and door hoist shafts, mechanical car seals, and power operated car pullers are just a few of many practical features. Johnston "Reverse Blast" low pressure burners for oil or gas assure clean, economical, efficient heat for annealing, normalizing, and stress relieving.

Write for Bulletin F-240

Johnston Equipment for the Foundry
● Melting Furnaces ● Heating Torches ● Ladle Heaters
● Heat Treating Furnaces ● Burners, Blowers, Controllers
Over Thirty Years Experience in Design and Manufacture.

THE JOHNSTON LINE — SAFETY DEPENDABILITY

JOHNSTON MANUFACTURING CO.
2825 EAST HENNEPIN AVE.
MINNEAPOLIS 13, MINN.

ENGINEERS & MANUFACTURERS OF INDUSTRIAL HEATING EQUIPMENT

Three cast boxes shown in various stages of repair—with original hole at left; hardened patch in center; machined casting at right

EPOXY RESIN COMPOUND
Is Versatile Foundry Tool

By ROBERT E. WILLIAMS
President
Southern Casting Co.
Sevierville, Tenn.

A RECENTLY marketed plastic compound has proved itself a versatile tool at Southern Casting Co. in the production of aluminum castings. An epoxy resin compound containing powdered aluminum, the material currently is used to salvage defective castings, cement gates to patterns and to make modifications in the patterns themselves. Upon occasion, it even has been used to calk metal air lines carrying 130-psi pressure.

In every instance this material has shown itself to be easy to use, inexpensive, efficient and acceptable to our customers. Called Metalset A2, the compound is manufactured by Smooth-On Mfg. Co., Jersey City, N. J.

TABLE I—Castings Rejected and Reclaimed

ITEM	HOW CAST	NUMBER IN RUN	REJECTS	REPAIRED	REMELTED
Chair arms	Two on a plate in flask 28 in. square	130	39	34	5
Chair backs	One on a plate in flask 20 in. square	465	36	26	10
Junction boxes	Two on a plate in flask 13 x 18 in.	950	64	40	24

The metallic putty originally was tested by Southern Casting Co. primarily as a patching material. After more than a year of use, it has demonstrated that it is an ideal material to repair imperfect castings when they are not destined for structural or mechanical uses.

Southern Casting Co. engages in production and jobbing casting and specializes in aluminum industrial castings. Customers range from chair manufacturers and builders of merry-go-rounds to agencies involved in atomic energy activities. Casting defects caused by misruns, raised cores and sand cracks account for a disturbing number of rejects in a normal run. Naturally, the percent-

Left side of pattern built up by applying material to its surface

Gates for this chair leg pattern were cemented in place by resin

Building up edge of ornamental grill by use of epoxy compound

Core joined with Delta Griptite Core Paste air or oven dries fast making a joint of extremely high tensile strength and unusually low gas ratio.
DELTA
GRIPTITE
CORE PASTE
WELD-BONDS A CORE JOINT
Stronger
THAN THE CORE ITSELF
Test results show the strong, completely weld-bonded joint that will not break where joined.

New Delta Griptite Core Paste penetrates deep into core surfaces to produce a welded bond of sand many times *stronger* than the core itself. Cores joined with Delta Griptite Core Paste will not break or fracture at the joint.

Delta Griptite Core Paste has a low gas ratio which eliminates the possibility of paste blows. It contains no low fusion materials, is completely stable and is non-reactive with molten metals. It is easy to mix, air or oven dries quickly and, when dry, is resistant to moisture pickup.

Available in 100 lb. paper bags or 400 lb. (net) lined wood barrels.

Working samples and complete literature on Delta Foundry Products will be sent to you on request for test purposes in your own foundry.

DELTA

DELTA OIL PRODUCTS CO.

MANUFACTURERS OF SCIENTIFICALLY CONTROLLED FOUNDRY PRODUCTS

MILWAUKEE 9, WISCONSIN

age in a specific run varies in accordance with the complexity of the casting, its size and the coring.

The accompanying table gives an idea of the variation in the number of rejects for several common items cast in the plant. The table also shows how many rejects can be patched with the metallic putty and how many must be remelted. The advantages of the patching compound do not lie in the numbers of rejects saved from the melt pot, but in the fact that any of the five men in our shipping and cleanup department can make a quick, inexpensive repair with it.

The compound is easy to mix and use. It comes as a two-component system—the basic resin, containing finely powdered aluminum, and the liquid curing agent. Curing is by polymerization or chemical action and, according to the manufacturer, shrinkage is 0.002 in./in. Other physical properties include compressive strength of 14,400 psi and Rockwell hardness of M-70.

When the two substances are mixed together, the material has a fairly short pot life and should be used within a half-hour. It has the property of staying where it is put, horizontally, vertically or upside down, and it can be applied easily to a clean surface with almost any sort of tool.

Since the resin hardens through on exothermic chemical reaction and the heat given off speeds up the curing, it makes good sense to apply the material heavily. The patch cures in a few hours at room temperature, and any excess can be removed in a simple filing or grinding operation.

Once mixed, the patching has to be used or wasted. This availability of material has promoted the cosmetic repair of additional negligible defects that normally would be acceptable to our customers. The result is that Southern Casting Co. is turning out cast aluminum products with greatly improved appearance without any actual additional expenditure.

Patching of defective castings is not the only use to which this compound can be put. A photo shows how the wall of a pattern has been built up so that the final casting will have increased wall thickness. Furthermore, as shown in another photo, gates can be cemented to patterns.

Naturally, this material cannot be used in place of helium arc welding to repair castings destined for mechanical or structural applications. And our castings for use at Oak Ridge have to be perfect without any repair or salvage efforts. During the period of more than a year that we have been using this metallic putty, however, we have found it to be an extremely valuable tool for its proper application.

British Institute Announces Two 1957 Medal Awards

The Institute of Metals — London, has announced two medal awards for 1957. To Dr. Maurice Cook, joint managing director, Imperial Chemical Industries Ltd., Metals Division, goes the Institute of Metals Medal. It recognizes his contributions to the science of metallurgy, to the nonferrous metals industry and to the welfare of the metallurgical profession.

The Rosenhain Medal goes to Dr. H. K. Hardy, research manager, United Kingdom Atomic Energy Authority, Industrial Group, in recognition of his contributions to knowledge in the field of physical metallurgy.

OLD STYLE GRINDERS
WASTE UP TO 45% OF YOUR GRINDING WHEELS!
AS WHEEL WEARS, SPEED DECREASES, PRODUCTION SLOWS!
STANDARD
INFINITELY VARIABLE SPEED
SNAGGING GRINDERS
adjust automatically with wheel wear to maintain proper peripheral speed.
You get FULL WHEEL WEAR DOWN TO THE FLANGES!
33VR
LEFT HAND

By merely turning a handle — *no tools required* — constant adjustment of wheel speed to compensate for wear is another EXCLUSIVE from STANDARD. STANDARD SNAGGING GRINDER installations coast to coast report wheel savings as high as 100% and increased production of up to 50%. Write today for our "Case History" file of *Savings Up-Cost Down Stories* that are proof positive!

Write Today for Literature

HALLMARK OF METALWORKING THROUGHOUT THE WORLD

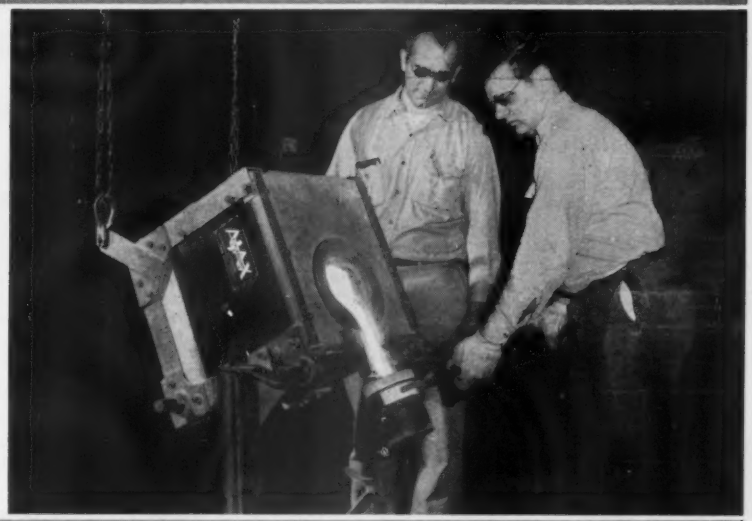
FOUNDRY GRINDER DIVISION

the STANDARD electrical tool co. SINCE 1912

SNAGGING GRINDERS AND MACHINE TOOLS

2507 RIVER ROAD • CINCINNATI 4, • OHIO

how Ajax induction melting meets investment casting requirements



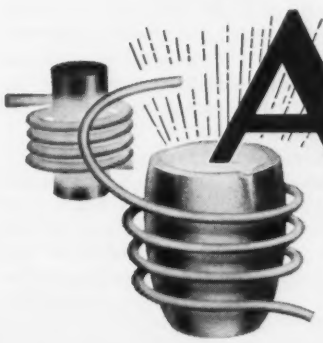
. . . at Precision Metalsmiths, Inc.

The special melting requirements of precision investment casting are an old story to Precision Metalsmiths, Inc., Cleveland, Ohio. This one foundry melts ninety-two different ferrous and nonferrous alloys . . . often in small quantities. Many of these alloys require unusual protection from contamination during melting—and substantially all are made to extremely close analyses. Carbon content in some must be kept *below .04%*.

Only an Ajax-Northrup converter-powered induction melting unit could meet the requirements of versatility, purity, and economy so well. That's why four Ajax units now satisfy all the company's production needs. Three 17 pound capacity portable furnaces are each powered by 20 kw Ajax-Northrup spark gap converters; and the fourth, a fifty pound capacity tilting furnace, is powered by a 40 kw Ajax-Northrup converter.

Precision Metalsmiths standardized on Ajax because Ajax-Northrup units cost far less to operate and maintain in operation. They're ruggedly constructed to take the toughest kind of service in stride. Normal converter maintenance is limited to cleaning the gap chamber and inspection at three month intervals. For additional details, write Ajax Electrothermic Corp., Trenton 5, New Jersey, requesting Bulletins 14-B and 27-B.

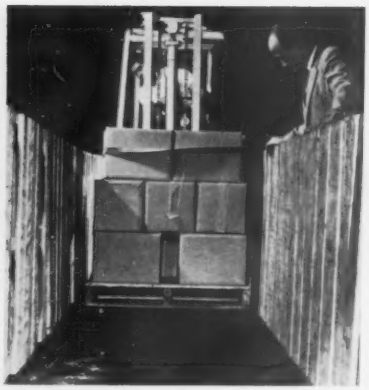
Associated Companies: Ajax Electric Company—Ajax Electric Furnace Co.—Ajax Engineering Corp.



AJAX NORTHRUP SINCE 1916

AJAX

INDUCTION HEATING-MELTING



Narrow aisles teach drivers how to handle trucks with accuracy and precision in close quarters

Classroom sessions supplement work on the driving range. Each class is limited to six members

Pertinent facts about operation of trucks are covered. Teacher here shows effects of overloads

Practice driving on the range includes instruction in loading and unloading of freight cars

Develops Program for
Training Lift Truck Drivers

By ROBERT G. DYMENT

ONE of the finest training programs for operators of fork lift trucks has been developed by the Eastman Kodak Co., Rochester, N. Y.

E. D. Happ, safety department, and A. C. More, training department, both of Eastman Kodak, felt that with the large use of lift trucks in their organization there was a definite need for a program that would train new operators and give more detailed instruction to drivers with previous experience.

Both men agreed that to obtain the desired results, supervisors of lift truck operations should also receive instruction and training, comparable to that given to the experienced driver.

A training program was drafted by Messrs. Happ and More and others working with them. Specific needs to make the program a success were submitted to management for consideration. Recommendations included the need for centralization of training, provision of a practice driving area, the number of hours needed to process a group of trainees. The estimated cost for the whole program also was included in the recommendations. With management's approval, the rough material was presented to departmental representatives for their comments and suggestions.

The committee then refined the proposed training course material, and three new members were added to the safety department staff to instruct both in the classroom and on the driving range. The safety department obtained three trucks. Three thousand square feet of floor space was allowed the program for driving range practice.

Course Length Varies—The final program consists of a 16-hour course for experienced operators and a 32-hour course for inexperienced operators. These include discussion type lectures, visual aids, printed materials for each session and frequent quizzes, all of which aid in maintaining interest. Classes are limited to six trainees.

Following is a resume of the material covered in each of the ten sessions for new operators. Most of this material is condensed to five sessions for experienced operators, who, being familiar with truck operation and terminology, can absorb the material at a faster pace.

Session 1—This first class introduces trainees to the purpose of training, to simple operating procedures, daily checks which they must make, and gives them time for simple maneuvering with the truck on the driving range.

Session 2—Features a quiz on Session 1 and considerable practice on obstacle course No. 1.

Session 3—Places emphasis on pertinent facts about power industrial trucks such as load limits, striking force, comparative cost of forktrucks, batteries and types of trucks used in the Kodak Park plants, along with their limitations and adaptions.

Session 4—Takes up the various problems involved in handling palletized material.

Session 5—Specifically presents the safe and efficient practice to be followed in truck and trailer loading and unloading operations.

Session 6—In like manner, the time of trainees is confined to that of handling material in connection with freight car operations.

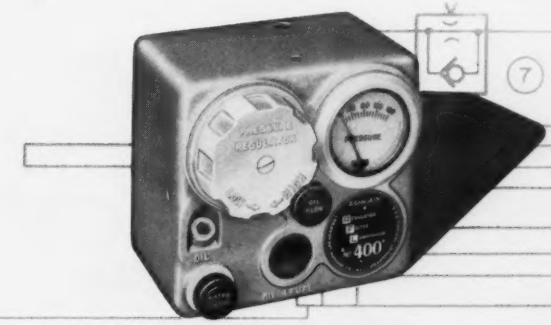
Session 7—Introduces single pallet storing. Explains where not to place materials and how to place them in proper storage areas.

Session 8—This session is a crucial one for many operators since it introduces the methods and problems involved in tiering and stacking of palletized material. Special aptitude is required to master the techniques of upper level work.

Session 9—At this time the trainee is given his final examination on the driving range. During his time in the classroom a number of items are discussed such as elevator operations, pallet patterns and crossing railroads.

Session 10—This session is devoted to instruction and discussion of the operator's responsibility in preventive maintenance.

Performance Is Grading Basis—Discussion of the results of quizzes is encouraged. Trainees are clearly informed that the purpose of the quiz is to assure the instructor that he has succeeded in putting across the material in an understandable manner. Trainees are graded only on



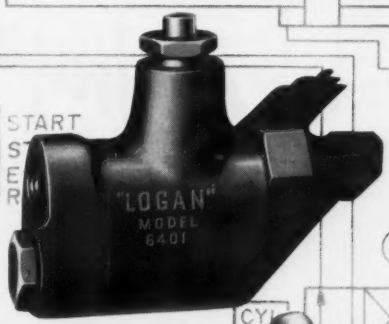
LOGAN MODEL 400 RFL UNIT
REGULATES, FILTERS, LUBRICATES

LOGANSQUARE CYLINDER
FOR AIR OR OIL SERVICE

Look to Logan

FOR POSITIVE, CONTROLLED

POWER



LOGAN MODEL 6401
ADJUSTABLE AIR SPEED
CONTROL VALVE

LOGAN MODEL 6540 4-WAY, 2-POSITION
AIR CONTROL VALVE

Yes, you can always depend on Logan for the most dependable components to effectively serve your air circuit requirements.

FREE *SEND FOR THE "LOGAN CALCULATOR"*

MEMBER: Natl. Mach. Tool Builders' Assn.; Natl. Fluid Power Assn.

LOGANSPORT MACHINE CO., INC.
850 CENTER AVENUE, LOGANSPORT, INDIANA

PLEASE SEND COPY OF CATALOG:

- ☐ 100-1 AIR CYLINDERS
- ☐ 100-2 MILL-TYPE AIR CYLS.
- ☐ 100-3 AIR-DRAULIC CYLS.
- ☐ 100-4 AIR VALVES
- ☐ 100-5 LOGANSQUARE CYLINDERS
- ☐ 100-5-1 ULTRAMATION CYLINDERS
- ☐ 51 PRESSES
- ☐ FACTS OF LIFE
- ☐ 62 SURE-FLOW PUMPS
- ☐ 200-1 HYD. POWER UNITS
- ☐ 200-2 ROTOCAST HYD. CYLINDERS
- ☐ 200-3 750 SERIES HYD. CYLINDERS
- ☐ 200-4 and 200-7 HYD. VALVES
- ☐ 200-6 SUPER-MATIC CYLS.
- ☐ 70-1 CHUCKS
- ☐ ABC BOOKLET
- ☐ CIRCUIT RIDER

TO:

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

You're SAFER
—time and money ahead
with— TM
factory made
ALLOY SLINGS!

TAYLOR uses
GAMMA RAY
QUALITY CONTROL
on master, joiner and end links...

CONTROLLED-ATMOSPHERE HEAT-TREATING
on popular chain sizes

New, patented
TAYCO HOOKS!
Pat. No. 2,646,306—7/21/53

Famous TM factory made Alloy Sling Chains are tougher—and safer! The use of Gamma Ray assures flawless, trouble-free welds on master, joiner and end links. This, in addition to our rigid standards...Controlled-Atmosphere Heat-Treating of popular sizes... patented Tayco Hooks and other superior production techniques, makes TM factory made Alloy Slings a better buy!

Call your INDUSTRIAL DISTRIBUTOR today!

S. G. TAYLOR CHAIN CO., Inc.
Hammond, Ind.
Pittsburgh, Pa.

TAYLOR MADE
A GREAT NAME IN
Chain SINCE 1873

the results of their driving range performance.

Problem driving sessions pertaining to situations which arise under actual driving conditions are set up, and the driver is required to solve these problems. Obstacle course driving sessions help develop skill and confidence, to break bad habits of old drivers and to assure that both new and old operators form good driving habits. New drivers, of course, spend a much greater percentage of time on the range than do seasoned drivers. Two instructors are present at all times on the driving range for verbal coaching and instruction.

One of the prerequisites to entering the course is that the operator be physically right for the job. Items considered in this medical check include field of vision, reaction, timing, distance, judgment, and possibility of other physical handicaps which might detract from the operator's ability to safely handle the truck under stress or strain.

Results of Program — Results of this carefully conducted safety training program at Eastman are:

1. Approximately 80 supervisors are better acquainted with safe fork-truck operations.
2. Twenty-four of their fire department staff are trained to enable them to move valuable material in the event of an emergency.
3. Approximately 80 new drivers have completed the training and are operating throughout the plant.
4. Retraining of over 400 experienced drivers is nearing completion.
5. All drivers are to be licensed so that only authorized and trained persons can operate trucks. This license is issued only after proof of ability on the job and by request of his foreman.
6. Fork-truck accident frequency has decreased steadily since the days prior to the first training session. The gospel of safe driving is spreading beyond the confines of the classroom.

Book Review

Panel Discussion on Pyrometric Practices, paper, 78 pages, 6 x 9 in., published by the American Society for Testing Materials, Philadelphia 3. Price $1.50.

Relating to practice in high temperature testing of metals, this volume contains the following papers: "Thermocouple Immersion Errors" by J. M. Berry and D. L. Martin; "Summary of Pyrometric Procedure Employed by One Company in Creep-rupture Testing and an Analysis of Results" by W. E. Lyda and "Creep and Rupture Test Pyrometry" by Charles R. Wilks.

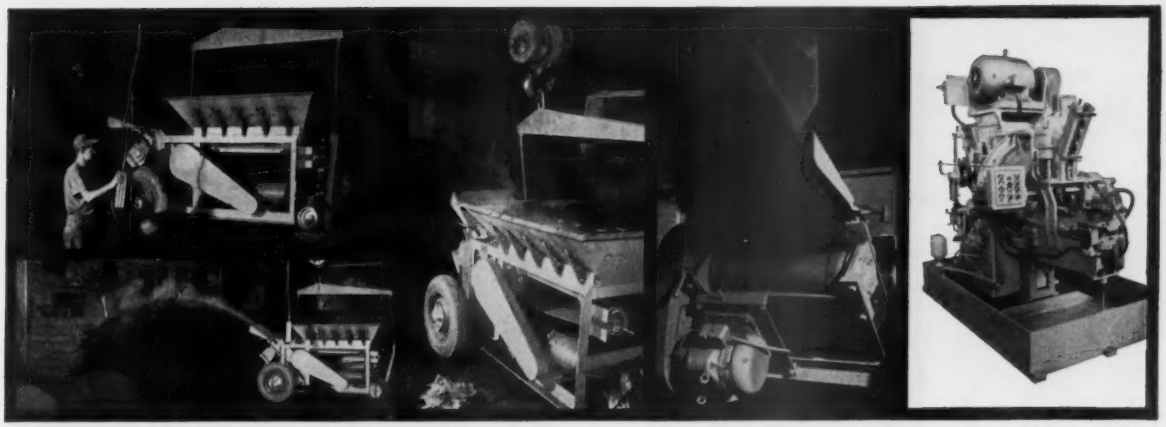
BOUND TO BE BETTER... All Ways!

SCIENTIFIC MATCH PLATES
Pressure Cast

Our expert craftsmen have years of experience in casting precision multiple duplicates from the most intricate master patterns. Plates are cast of aluminum and poured under pressure to guarantee accuracy of detail. Molding is done in plaster only.

We Welcome Your Inquiries

The SCIENTIFIC CAST PRODUCTS Corp.
1390 East 40th St., Cleveland 3, Ohio
2520 West Lake Street, Chicago 12, Illinois



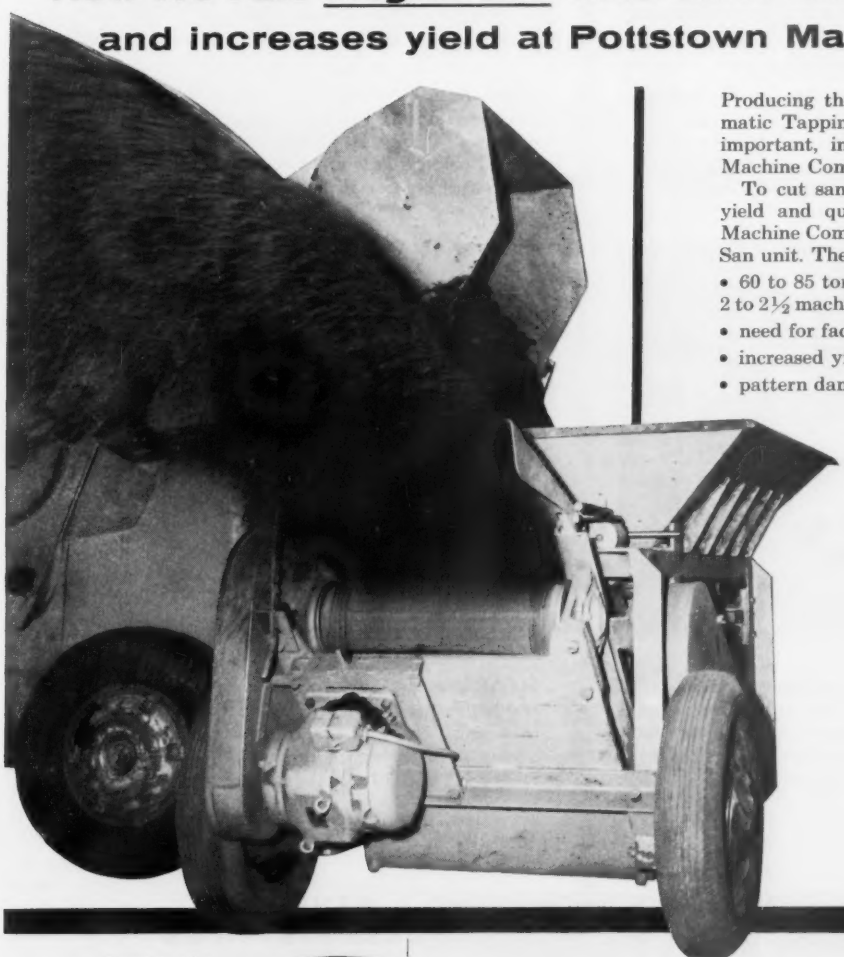
(Upper) Compact—Highly Portable . . . 60" x 90" size fits it into any layout . . . turns on 6½ foot radius . . . handy yoke hitch for crane moving.
(Lower) At Pottstown, Magna-San flanks each molding station with 20-foot windrow of cooled, perfectly conditioned sand.

15 cu. ft. hopper can be fed from three sides, as fast as a front end loader can be positioned. Note hopper grate to "hold up" large sprues, spills, etc.

Handling a very heavy sand at Pottstown, note fluffy, clean, thoroughly-aerated discharge. Rugged construction is typical of Royer.

End Result—a high-quality precision tool—Pottstown's internationally-known Automatic Tapping and Threading Machines for pipe fittings, valves, etc.

How ROYER Magna-San cuts sand conditioning costs and increases yield at Pottstown Machine Company



Producing the castings for their famous Automatic Tapping and Threading Machines is an important, integrated operation at Pottstown Machine Company.

To cut sand conditioning costs and increase yield and quality of castings, the Pottstown Machine Company chose the *new* Royer Magna-San unit. Their experience:

- 60 to 85 tons of sand perfectly conditioned in 2 to 2½ machine hours . . . only 4 to 5 man hours
- need for facing sand cut more than 50%
- increased yield of finest quality castings
- pattern damage cut to rock bottom
- a *new method* that makes entire foundry operation more clean-cut and straightforward

Magna-San magnetically cleans, mixes, blends and aerates up to 45 tons of sand per hour—at a lower initial cost and much less upkeep than any other mechanical method. Investigate this valuable addition to the facilities of *your* foundry—be it large or small. Write for detailed literature and the name of the service-minded Royer agent in your area.

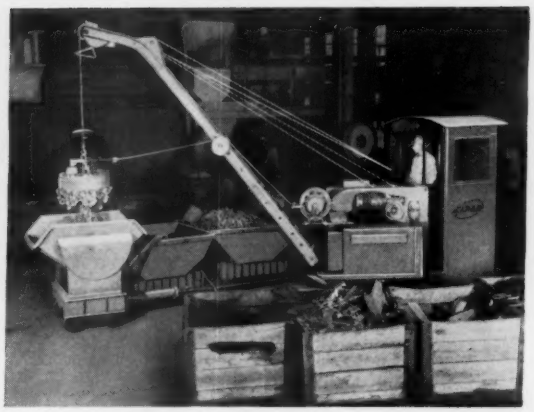
Foundry-wise agents throughout the U.S. and Canada
EXPORT DEPT.
10406 South Western Ave.
Chicago 43, Ill.

ROYER

ROYER FOUNDRY & MACHINE CO.
159 PRINGLE STREET / KINGSTON, PENNA.
FOREMOST IN SAND CONDITIONING EQUIPMENT

How 4 foundries save with ELPAR®

ELPAR FORK TRUCK with special forks lowers load of heat-treated castings into quench tank. Truck also loads and unloads furnaces. Castings remain on the same skid throughout the entire heat-treat cycle—and one man and the ELPAR do all the work.



ELPAR Crane with magnet loads 200 tons of scrap and pig iron into skid boxes every day. It also places measured amounts of scrap, sprue and iron into dump bucket that feeds cupola charging skip. Even dump bucket operation is controlled by craneman.

ELPAR High Lift Platform Truck speedily tiers rack of fragile cores. Because of smooth ELPAR performance and a special rack system, storage capacity has been doubled, core selection simplified and damage to costly cores eliminated.

ELPAR Low Lift Platform Truck moves loaded charging bucket weighing 9,620 lbs. from make-up point to cupola. This and one other ELPAR truck handle 450,000 lbs. every 8 hours. Schedules are maintained . . . and 80 man-hours per day are saved.

- The exact type for your specific needs . . .
- Safe, sure handling of scrap, cores or castings . . .
- Built-in dependability that assures steady year-after-year service . . .

. . . For these three reasons alone, it will pay you to make your next truck an ELPAR.

SEND FOR
CASE HISTORIES
2, 14, 29, 31

THE ELWELL-PARKER ELECTRIC CO.
4312 ST. CLAIR AVENUE • CLEVELAND 3, OHIO

Crane Operator Is Only Woman in Buffalo Plant

By George E. Toles

THE only woman in the foundry of the Allegheny Ludlum Steel Corp. plant in Buffalo is Mrs. Myrtle Oxford. Mrs. Oxford stands only a little over 5 feet but she operates one of the biggest machines in the plant.

Mrs. Oxford has been employed as a hot-metal crane operator ever since she took the World War II job in 1942.

After the war men returned to most of the jobs held by women, but in the case of Mrs. Oxford no shift was made. Her expert handling of one of the pivotal machines in the foundry left little to be desired.

The 7½-ton overhead crane which

Mrs. Oxford at the crane controls

she operates picks up ladles of molten steel from the electric furnaces and carries them to molds for pouring.

A mistake in manipulating the crane controls could result in a serious accident. Even a slight error in judgment in bringing the ladle to its destination above the mold could cause the metal to spill.

Although she usually works a six-day week, Mrs. Oxford loves her job.

"I move hundreds of tons of molten metal a day, but actually it's easier than pushing a baby buggy down the street." she said, "It's not the least bit monotonous. It's all business, however. You can't do any fooling around."

Not only is skill required in moving the ladle to its proper position, but the operator must be alert to everything that's going on below. The crane's movements must be timed so as not to endanger any plant personnel working on the floor of the foundry.

To insure safety, the foundry insists on daily checks of its cranes. Before she mounts hers, Mrs. Oxford makes a double-check of the cables and hoist brakes as if she were an aviator about to take off on a cross-country hop.

She was broken in on crane work three weeks after she started working for Allegheny Ludlum. She has operated both cranes in the foundry and the one in the grinding room on which she learned. She never has had an accident while working with any of her cranes.

Book Review

ASTM Standards on Metallic Electrical Conductors, paper, 300 pages, 6 x 9 in., published by the American Society for Testing Materials, 1916 Race St., Philadelphia 3. Price $3.50.

Contains 52 ASTM standards pertaining to metallic electrical conductors on copper, copper-alloy and copper-covered steel wire; stranded conductors; rods, bars and shapes; pipes and tubes. Also on aluminum wire, stranded conductors, rods and bars; galvanized steel core wire, and other galvanized iron and steel wire.

Cut foundry operating costs . . .

Transite Core Plates are strong and durable . . . resist warpage, impact and abuse, provide long service life.

with Transite Core Plates and Slip Jackets

"Johns-Manville Transite* Core Plates help assure maximum production in minimum time"—that's the experience of foundrymen who have used them for years. Made of asbestos and cement, they are light in weight, yet strong and durable. Being non-metallic, they resist corrosion, maintain their smooth surface and can be easily cleaned.

Transite Slip Jackets are a companion product with similar advantages. They do not burn, retain their original shape despite runouts. Slip jackets are furnished in both white and black types. The latter is widely used as a protective liner for metallic slip jackets.

FREE . . . New Folder gives complete details on Transite Core Plates and Slip Jackets—as well as Transite Pallite products for dielectric furnaces. For your copy of folder PP-31A, write Johns-Manville, Box 14, New York 16; in Canada, 565 Lakeshore Road East, Port Credit, Ontario.

Transite Slip Jackets cost less than other types . . . last longer, too. Result—important savings for foundries.

*Reg. U. S. Pat. Off.

JM PRODUCTS **Johns-Manville TRANSITE** CORE PLATES AND SLIP JACKETS

Decentralization Intensifies FIRE PROTECTION PROBLEMS

Gary Post-Tribune

By BYRON J. O'HARA
Vice President
Buffalo Fire Appliance Corp.
Dayton, Ohio

INDUSTRY'S practice of locating new plants in rural, sparsely-populated areas is an accepted fact and no doubt it is paying dividends.

At the same time, this decentralization poses a problem that becomes more pressing each year, more demanding of action. The problem is the threat of ruinous fire.

How that threat is growing is seen in statistics compiled over recent years. They show that major industrial fires (those causing $250,000 or more damage) are increasing in outlying communities.

In 1954, for example, there were 75 major industrial fires. Of these fires, 40 were in communities of 20,000 population or less. In 1955, the number of these fires in rural areas increased to 48. Meantime, the number of fires in large cities decreased from 35 in 1954 to 30 in 1955.

While a two-year comparison hardly indicates a definite trend, it does point an accusing finger. Indeed, it brings to the fore a hazard which must be faced and dealt with by companies contemplating plants in rural areas. As the National Fire Protection Association explains it:

". . . more than one out of every two of these large-loss fires is occurring where public protection can not be expected to meet the requirements of large area industrial properties . . ."

Furthermore, says the NFPA, these smaller communities may not have developed regulations governing building construction, industrial hazards, water supplies and fire alarm systems to the degree normally found in larger cities.

Check Public Protection—The warning seems clear. It would be wise for the company planning a relocation to investigate the proposed community's fire protection facilities. If these safeguards are inadequate, the burden will be on the company itself to act quickly and efficiently when fire strikes. For once a plant fire in a small community gets out of hand, the chances are it will be a costly one.

If internal fire protection is of paramount importance to the large city plant (and it is), then it is doubly important to the plant in the small community. No industrial property is too small to establish its own protective system. The difference is only in degree.

The amount and type of protection hinges on several factors:

1. The availability of public fire protection, water supplies, etc.
2. The physical size of the plant.
3. The type of operation.

A paint factory, for instance, should have greater in-plant fire protection than a foundry, all other things being equal. The intrinsic fire hazards present in the paint operation are greater than in a foundry.

On the other hand, a large foundry should have more fire protection than a smaller one. And in a large-acreage, multi-building plant, mobile units might be called for whereas they would be superfluous in an operation just as big, but confined to one multi-story building.

The nearness of public fire protection would naturally enter into in-plant protection plans. The length of time it would take public fire companies to arrive after an alarm, the abilities of the fire companies and the like are major factors.

Factors To Consider—In planning plant fire protection, the following should be considered:

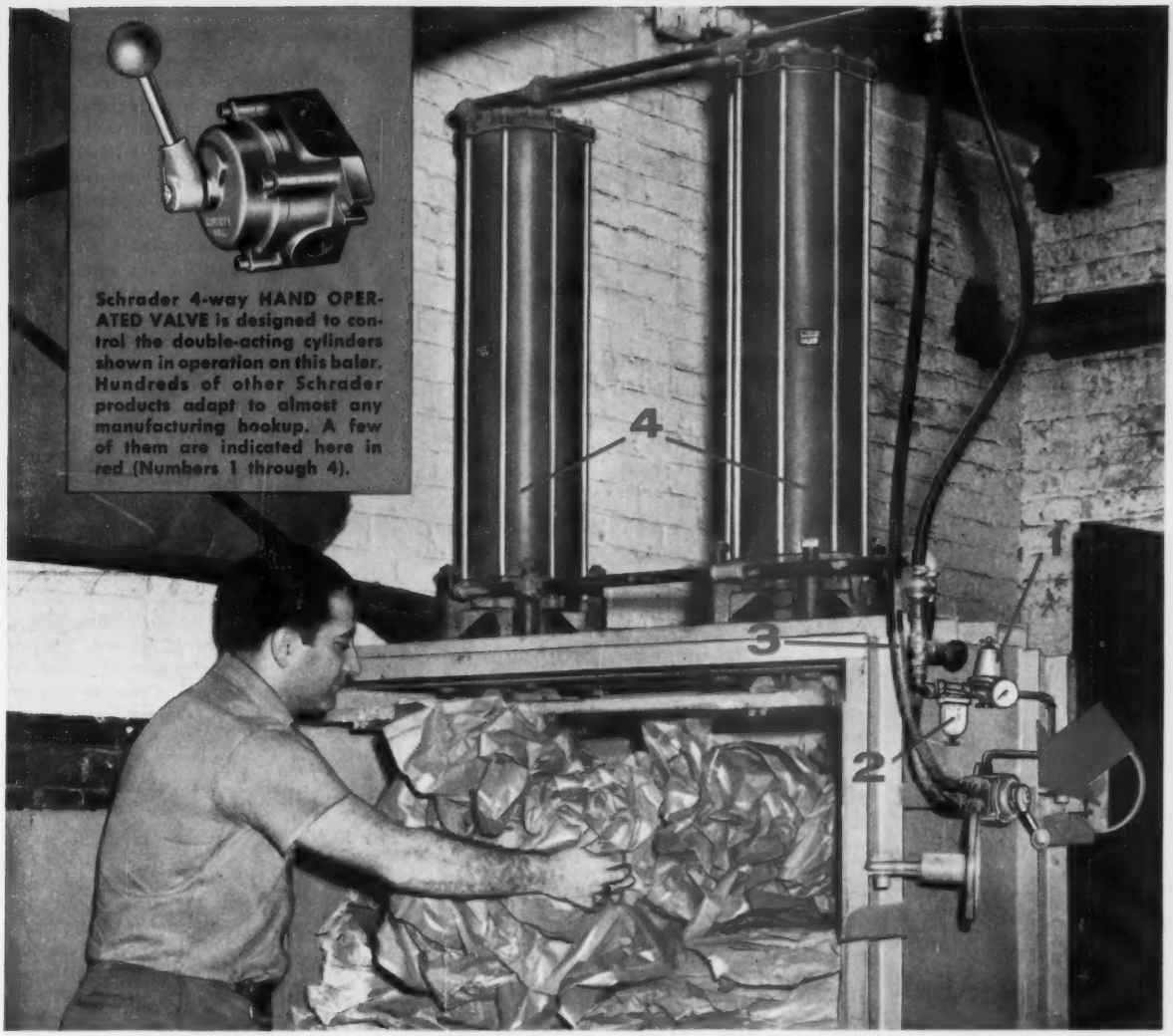
1. Building design.
2. Fire protection equipment such as sprinklers, mobile units, extinguishers, etc.
3. Fire training for plant fire department personnel and other employees.

Plant fire protection rightfully starts in the design of the building. Too many plants have been designed, and still are being designed, with only a passing concern for fire protection. Yet good construction can aid immeasurably in arresting the growth of a fire.

The importance of good building design was highlighted in a survey of the 78 major industrial fires of 1955 and the causes which helped those fires to spread. These fires averaged $1 million in damage. In half the fires, there were areas with too much floor space unbroken by dividing walls. Nine plants had dividing walls, but without fire doors. In five others, openings for conveyor systems were unprotected. In 24 of

CAUSES OF PLANT FIRES

Cause	Per Cent of Total
Electrical equipment	19
Machine friction	14
Foreign substances	12
Exposure to flame (torches, open gas and oil flames)	9
Smoking and matches	8
Spontaneous ignition	8
Exposure to heat	7
Sparks from fires (chimneys, burning rubbish, etc.)	6
Overheated materials	3
Miscellaneous (chemical reaction, static electricity, lightning, etc.)	14


Schrader 4-way HAND OPERATED VALVE is designed to control the double-acting cylinders shown in operation on this baler. Hundreds of other Schrader products adapt to almost any manufacturing hookup. A few of them are indicated here in red (Numbers 1 through 4).
4
3
2
1

How Schrader Air Products bale paper, producing 4 ton pressure with 100 lbs. of air

At this Rhode Island dye works, the paper baling operation formerly was a fatiguing manual chore. Now, the operator simply fills the press with used paper and cartons, and pulls a 4-way hand valve. One hundred pounds of air pressure flowing through the two Schrader double-acting cylinders then compress the paper with four tons of force. Finger-tip adjustments can reduce or raise pressure quickly, easily.

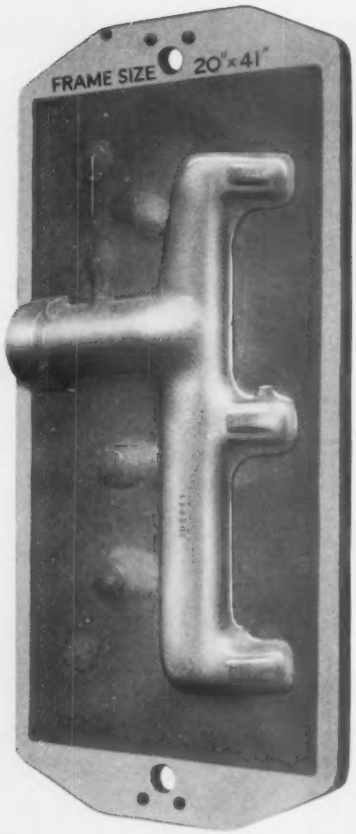
Safe, simple, fast – compressed air daily performs miracles in hundreds of different ways. More and more manufacturers think "air" when they think "automation." Holding work, moving scraps, synchronizing actions—all such operations can be automated with Schrader Air Products.

Air means economy, too. Upon request, Schrader engineers will assist you in planning for the most efficient use of air and in selecting the products best suited to your applications. Tell us your problems. We'll be glad to help. Or send for the latest informative booklets.

Schrader®
ESTABLISHED IN 1844

A. SCHRADER'S SON
Division of SCOVILL
465 Vanderbilt Avenue, Brooklyn 38, N. Y.

FIRST NAME IN THE USE OF AIR
FOR INDUSTRIAL PRODUCTION AND CONTROL



"The type of work we produce in TAMASTONE we would be unable to make at all in the absence of skilled help"

COLUMBUS BRASS & ALUMINUM CO., INC.
Columbus, Indiana

This Drier pattern for a diesel intake manifold is made from an original master pattern. *Only one skrinkage!* Pattern was used for 500 pieces. Only 3½ hours labor and 50 pounds of TAMASTONE were required. Up to 1,000 castings have been made from a plate of this type!

No special skill needed to increase production 400% or more! . . . WRITE . . .

TAMMS INDUSTRIES, INC.
228 N. LaSalle Street
Chicago 1, Illinois

Circle 714 on Inquiry Card—Page 209

CHILL KOOLHEAD NAILS

Chill Nails and Spiders

You can rely on "KOOLHEAD" and "STANHO" products

for...
ACCURATELY CONTROLLED FOUNDRY CHILLING

Write for samples and prices

Choose any style from Jumbo to Stubby; slim, medium or horse nail blade; blunt, pointed, straight or 90° bent. There's a type and size Koolhead Chill Nail or Spider Chill to do your specific chill job best.

STEEL Stanho PRODUCTS

the Quality Line

- WOODRUFF KEYS
- MACHINE KEYS
- MACHINE RACK
- TAPER PINS
- COTTER PINS
- SPECIAL PARTS

and other Stanho products Bulk or Packaged

WRITE for CATALOG and PRICES

STANDARD HORSE NAIL CORP
Since 1872
NEW BRIGHTON, PA

Circle 715 on Inquiry Card—Page 209

45 multistory buildings included in the group, unprotected vertical openings such as stairways and elevator shafts helped the fires spread.

In the case of fire fighting equipment, many companies are prone to secure only the bare minimum required to meet local regulations and to qualify for insurance premium reductions. They have the equipment because they're supposed to, but they have little faith in its efficacy in combating fire. That prejudice is unfounded. Plant fire protection equipment has proved its worthiness.

To illustrate, a one-year survey made by the Safety Research Institute found that nearly one-third of all recorded fires are put out by hand fire extinguishers before the arrival of the fire department. The survey covered records in 191 cities throughout the nation. Of 41,657 recorded fires, 13,624 or 32.7 per cent were controlled by portable fire extinguishers.

Local and national building codes, says *Architectural Record,* "cover the basic elements which must be considered in good, fire-safe design. However, there is more to ensuring maximum fire safety in buildings than a mere compliance with 'the letter of the law.' There is a 'morality' in design which goes beyond the codes and insurance rating schedules."

Sound Practice Required—In the final analysis, good fire protection is secured by sound fire engineering practices. As Chester I. Babcock, manager of the NFPA Fire Record Department, said in a speech last year:

". . . last year's large fires got that way primarily because sound fire protection engineering principles were not applied. One or other of two conditions was responsible:

"Well, I've followed through the whole thing inside and out and so far the only thing it's clogged with is me."

New LINDBERG–FISHER Autoladle

Here, for the first time, is a ladling unit that makes automatic casting of aluminum not only possible but practical. The Autoladle has been thoroughly tested and proven in service.

"LITTLE JOE" provides these advantages:

- Adaptable to induction, electric resistance or fuel-fired reverberatory furnaces.
- Ladled metal is withdrawn from beneath surface of bath.
- Precise, accurate control of any size shot up to 30 lbs.
- No interruption of the casting cycle during charging of metal.
- No variation of size of shot due to metal level changes.
- Composed of special refractory materials so arranged that ladled metal cannot come in contact with any metal.

We call it

"LITTLE JOE"

To the best of our knowledge this is the first practical automatic ladling unit yet devised. It will fill an important need in many casting operations. For complete information, get in touch with your nearest Lindberg Field Representative (see your classified phone book) or write direct.

LINDBERG FISHER **MELTING FURNACES**

A Division of Lindberg Engineering Company, 2453 West Hubbard Street, Chicago 12, Illinois

Knowing the facts . . .
you'll choose Neff & Fry Bins

Super-Concrete Staves—virtually as hard and dense as natural stone—comprise the walls of Neff & Fry Bins (silos). The edges are tongued and grooved. The ends are diagonal so that surrounding hoops will impinge directly upon the horizontal joints.

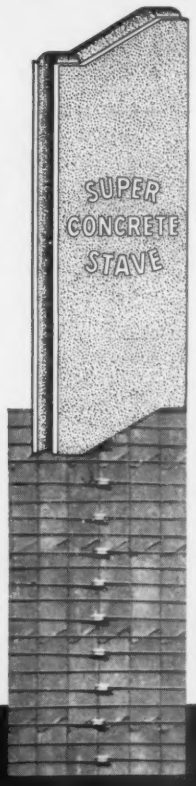
Each stave is 10" wide x 30" long x 2½" thick. Note particularly the thickness. It means a Neff & Fry Bin has great interior capacity in relation to external diameter. It also means a substantial saving of cement compared to that used in thick-walled concrete bins.

Because the staves have crushing strength of up to 8,250 psi, Neff & Fry bins carry heavy superstructures without additional supports—and that can save a large amount of construction cost.

Neff & Fry Bins don't rot, rust, spall, or burn. They never need face-lifting.

And these are just a few of the facts. If you knew them all, you'd certainly choose Neff & Fry Bins when you need facilities for handling and storing any kind of flowable bulk material. Ask us for complete information.

Not exported except to Canada and Mexico.

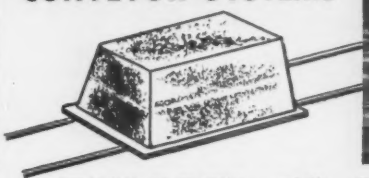


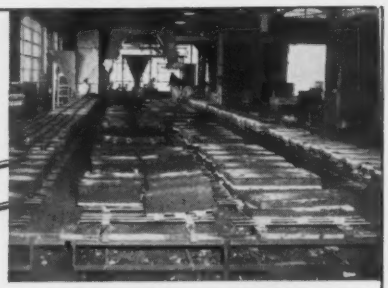
THE NEFF & FRY CO.
214 ELM STREET • CAMDEN, OHIO

SUPER-CONCRETE STAVE STORAGE BINS

Circle 720 on Inquiry Card—Page 209

NOMAD
CONVEYOR SYSTEMS





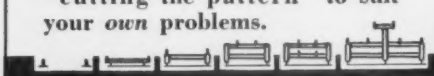
...TAILORED TO FIT YOUR NEEDS

There is a "just-right" piece of Nomad equipment to do the job whether for basic foundry needs or for fully powered mold handling line consisting of mold dump, pallet raiser or elevator. In each case your foundry layout will be space-saving and compact with increased efficiency and high profit-making production.

Nomad Foundry Equipment is adaptable for use by big mechanized foundries or for the smaller foundry who wants to modernize.

Write for more information on "cutting the pattern" to suit your *own* problems.

Mold handling mechanism and pallets pat.



NOMAD
FOUNDRY EQUIPMENT

WESTOVER CORPORATION
NOMAD EQUIPMENT DIVISION
3110 W. FOND DU LAC AVE. • MILWAUKEE 10, WIS.

Circle 721 on Inquiry Card—Page 209

Either a good fire protection engineer was not on the job, or somebody somewhere in the picture decided to be satisfied with mediocre fire protection."

Architectural Record corroborates Mr. Babcock's beliefs:

"With the increasing complexity of present-day technical building installations, architects are recognizing more and more the necessity for calling upon the experience of fire protection engineers in designing fire safety into their buildings. Most fire insurance companies number among their personnel fire protection engineers who are available for consultation. And there are a few firms which exist for the express purpose of offering fire protection engineering services.

"Most of these sources agree that fire protection is expensive only when it is too late. It is expensive, in loss of both property and life, if a building is demolished by fire and must be rebuilt with much-improved fire safety features. It is expensive also if fire protection is added to a building as an afterthought."

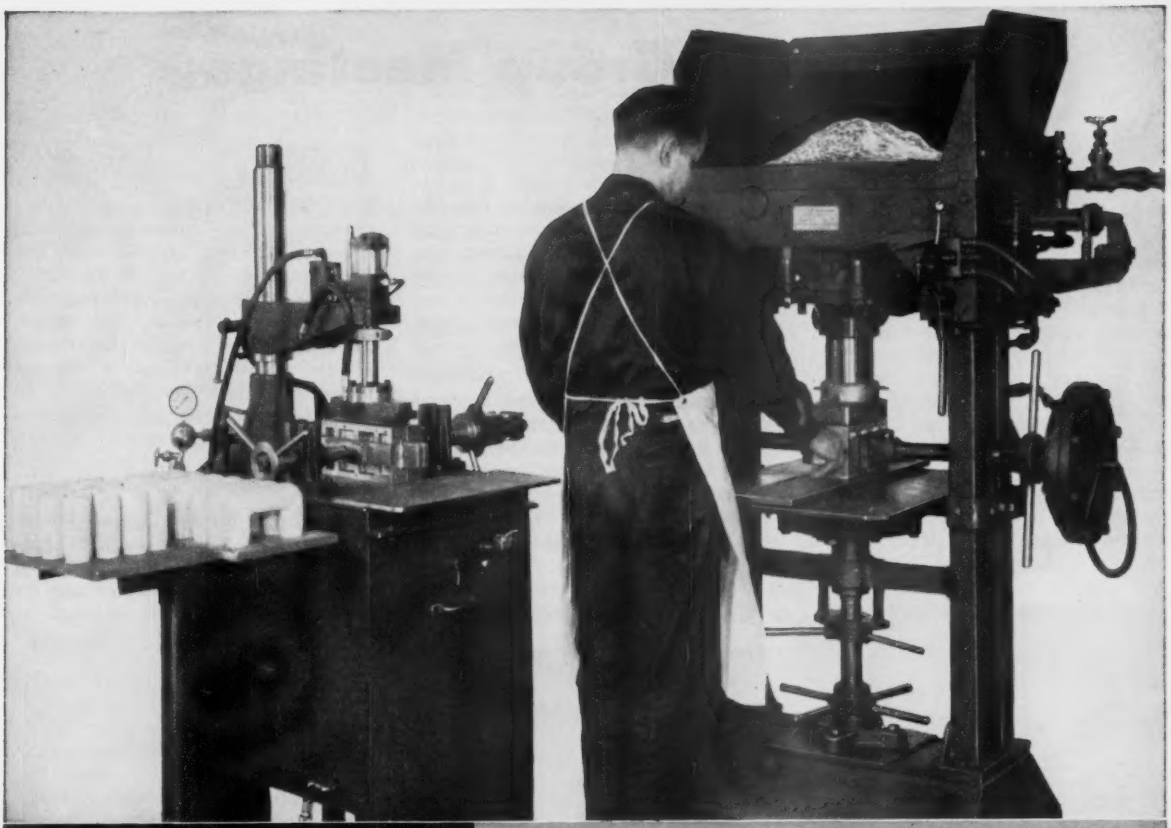
Booklet Covers Human Factors In Industrial Relations

"Humanics," the fifth of a series of booklets on cost reduction for industrial management, has been released by Wheeler Associates Inc., management and engineering consultants, Cleveland. It deals with such human or personal issues and problems in labor-management relations as teamwork, planning, employee effort and creative ability.

Employee ideas, their treatment and compensation for them make up a section of the booklet. Other portions cover what employees should be told about their employer's business, how to get labor's point of view, mental attitudes of both executive and production people and other topics. Copies are available from Wheeler Associates Inc., 15017 Detroit Ave., Cleveland 7, O.

Material Handling Institute Meets, Elects New Officers

George G. Raymond Jr., president, Raymond Corp., Greene, N. Y., was re-elected president of the Material Handling Institute at its annual meeting on Dec. 11. Robert L. Fairbank, vice president, Towmotor Corp., Cleveland, was elected first vice president and Eugene Caldwell, executive vice president, Hyster Co., Portland, Oreg., was elected second vice president.



Redford

NO. 4 CORE BLOWER with AUTOMATIC CO_2 CORE HARDENING STATION

The *right tools* to assure uninterrupted production if you make cores by the CO_2 Process.

One core box is being blown while another one is automatically clamped, the cores hardened in the core box and the core box released ready to remove finished cores. If core boxes are suitable, cores can be mechanically stripped as shown in the picture at the right.

The Core Hardening Station is completely air operated. Automatic time cycle is quickly adjusted to meet job requirements.

Whether you blow cores with conventional sand mixtures or use the new CO_2 Process, REDFORD equipment gives you the *best* in over-all performance.

Redford **IRON & EQUIPMENT CO.**
20733 Glendale • Detroit 23, Michigan
Phone: KEnwood 1-8611

Foundry Group Meetings

St. Louis: Edward Oakley, assistant supervisor of inspection, Delco-Remy Division, General Motors Corp., Anderson, Ind., discussed the uses of statistical quality control in the foundry at the December meeting of the AFS chapter. Mr. Oakley showed his audience that the laws that control probability in games of chance also have been made to work for manufacturing processes.

Aided by the use of charts and a frequency distribution demonstrator, the speaker pointed out that quality control fundamentals apply to all manufacturing, including the foundry. He said that most foundrymen have much data available about their own processes and quality control is frequently the best way to organize and interpret these data.—*Ralph Johnston, East St. Louis Castings Co.*

Texas: The AFS chapter met with the student chapter of Texas A & M College at College Station, Tex., on Dec. 7. Student speakers were Charles Crow, president, student chapter, "Would It Be Advisable to Establish a Foundry Course at Texas A & M?"; Alex Lord, "Factors of Safety in the Foundry," and Carl Livesay, "What I Learned from the Work Done in the A & M Foundry."

Edwin E. Pollard, chief engineer, Tyler Pipe & Foundry Co., Tyler, Tex., spoke on the "Water Cooled Cupola." With the aid of colored slides and drawings, he presented his company's recent experiences with this melting unit.—*C. Eugene Silver.*

California Conference To Be Held March 15-16

Conference Chairman Charles R. Marshall, left, Industrial Foundry & Supply Co., discusses conference arrangements with Riki Lipe and Technical Chairman Harold Hirsch, American Brake Shoe Co. Publicity Chairman Jay Snyder, at right, Joseph Musto Sons-Keenan Co., Abrasive Division, lines up the trio for the photographer

THE biennial California Regional Foundry Conference, sponsored by the Northern and Southern California Chapters of the American Foundrymen's Society, will be held at the Hotel Claremont, Berkeley, on Friday and Saturday, March 15-16.

The program will include sessions devoted to "Air Pollution," "General Foundry Practices" and related subjects pertinent to foundries.

The conference committee is headed by Charles R. Marshall, Industrial & Foundry Supply Co., Oakland, Calif., who is general chairman for the affair. Technical section chairman is Harold Hirsch, works manager, American Manganese Steel Division, American Brake Shoe Co., Oakland.

Speakers for the two-day conference include Benjamin Linsky, air pollution control officer, Bay Area Air Pollution Control District, and E. Paul DeGarmo, chairman, Division of Industrial Engineering, University of California, Berkeley. Prof. Gilbert S. Schaller, University of Washington, will be the principal speaker at the Friday night dinner.

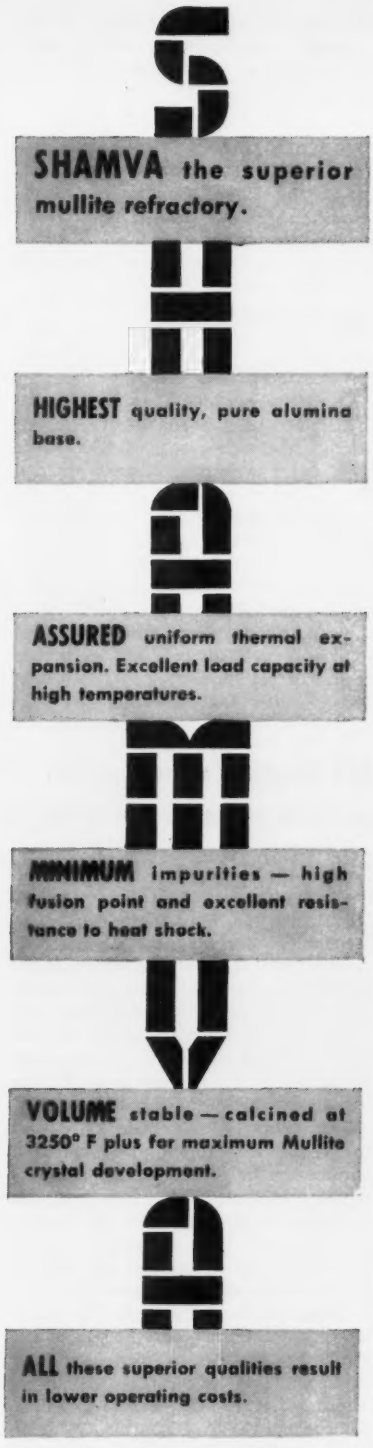
Saginaw Valley: Annual Foundry Night was held by the AFS chapter on Dec. 6. Representatives of foundries within the chapter area described their particular foundry operation in an attempt to promote a closer relationship with each other while spreading foundry knowhow.

Speakers on the program were F. P. Strieter, Die Casting Plant, Magnesium Dept., Dow Chemical Co., Midland, Mich.; Roy W. Foster, Bay City Foundry Co., Bay City, Mich.; John Stout, Buick Motor Division, General Motors Corp., Flint, Mich.; Ray Klawuhn, Genesee Foundry & Pattern Co., Flint, Mich., and Howard McClellan, Eaton Mfg. Co., Vassar, Mich.—*Ormond Requadt, Dow Chemical Co.*

Chicago: Management and past presidents were honored by the AFS chapter at its Jan. 7 meeting at the Chicago Bar Association. Speaker was A. L. Boegeheld, manager of research staff activities, General Motors Corp., Detroit, who discussed "Materials in the Automobile of the Future."

Chapter President Robert P. Schauss, Chicago manager, Werner G. Smith Inc., presided and introduced the past presidents. Since 1934, the chapter has been served by 23 presidents, 21 of whom are living. Of these, 13 were present. In order of service, they were James Thomson, L. J. Wise, H. W. Johnson, G. P. Phillips, L. H. Hahn, C. K. Faunt, W. D. McMillan, C. V. Nass, W. W. Moore, John Owen, John A. Rassenfoss, R. L. Doelman and J. T. Moore.

As chairman of the entertainment committee, J. C. Mulholland, chief metallurgist, Pettibone Mulliken Corp., detailed arrangements for the Ladies' Night party at the Knickerbocker Hotel on Feb. 16. Director of membership Don G. Schmidt, metal-


SHAMVA the superior mullite refractory.
HIGHEST quality, pure alumina base.
ASSURED uniform thermal expansion. Excellent load capacity at high temperatures.
MINIMUM impurities — high fusion point and excellent resistance to heat shock.
VOLUME stable — calcined at 3250° F plus for maximum Mullite crystal development.
ALL these superior qualities result in lower operating costs.

WRITE FOR NEW CATALOGS
No. 101 Shamva Specialties
No. 102 Brick & Special Shapes

THE MULLITE REFRACTORIES CO.
SHELTON 4, CONNECTICUT

REPRESENTATIVES IN: Buffalo Chicago Cleveland Detroit Lancaster, Ohio New York Philadelphia Pittsburgh San Francisco Seattle Los Angeles Denver Tulsa In Canada: A. P. Green Fire Brick Co., Ltd. Main Office: Toronto

Circle 717 on Inquiry Card—Page 209

lurgist, H. Kramer & Co., announced chapter membership at 896, or nine over the year's target.

Don Davis, American Steel Foundries, outlined briefly the educational course on "Sand" to be conducted in March. The program will start on March 4 with J. R. Young, process engineer, Cadillac Motor Car Division, General Motors Corp., Detroit, speaking on "Automated Sand Systems." Lecture sessions will follow on March 11 and 18.

Chapter Vice President W. O. McFatridge, supervisor of foundry laboratory, Manufacturing Research, International Harvester Co., introduced Mr. Boegehold, who made it clear that castings will continue to be important in automobiles of the future. However, the need to make cars lighter and more efficient will accelerate the trend toward greater use of aluminum and magnesium. For crankshafts, the trend will be to shell-molded pearlitic malleable or ductile iron.

The future will see use of free piston engines and gas turbines, in the opinion of Mr. Boegehold. Gas turbine engines will require high-alloy materials, but they probably will not use as much nickel as at present.

Roundtable sessions are scheduled for the Feb. 4 meeting. Sessions and speakers are: Gray Iron—"Practical Inoculations of Gray Iron" by Howard Wilder, Vanadium Corp. of America; Malleable, Steel and Patterns—"Design and Application of Malleable and Steel Castings," by Robert Frank, Superior Steel & Malleable Foundry Co.; Nonferrous—"Nonferrous Gating and Risering" by Fred Riddell, H. Kramer & Co.; Maintenance and Engineering — "Electrical Equipment for Foundries," by R. Schadt, Westinghouse Electric Corp.—*Erle F. Ross.*

Lehigh Valley: "CO_2 Mold and Coremaking" was discussed by Paul H. Ducharme, foundry manager, Doran Foundry Division, Columbian Bronze Co., and Hans Jacob, foundry superintendent, Lehigh Inc., at the Dec. 11 meeting of the AFS chapter at Hogg Hall, Lafayette College, Easton, Pa. Technical chairman was Charles Brochini, metallurgist, Lehigh Inc.

Mr. Ducharme related his experiences in making large bronze propeller molds with the CO_2 process and Mr. Jacob described his experiences at Lehigh Inc., where CO_2 cores have been used in large volume. (See FOUNDRY, October, 1956, p. 166, and this issue p. 104.)

Frank E. Schumann, Lehigh Inc., gave a coffee talk on "Coffee Break"

7 things to remember about BLASTRITE SHOT AND GRIT

QUALITY
EFFICIENCY
ECONOMY
LONG WEAR
CAREFUL SCREENING
PROPER ALLOYING
LABORATORY CONTROL

AVAILABLE IN ALL SIZES

Ask for our new catalog No. AB-53

ABRASIVE SHOT & GRIT CO., INC.
SPRINGVILLE, N. Y.
Telephone Springville 1

Circle 718 on Inquiry Card—Page 209

TERRE HAUTE
SPECIAL FOUNDRY COKE

"...as you want it!"

- Only premium grades of coking coals go into it—the best the market affords.
- Full care to highest possible fixed carbon and shatter resistance. Low ash. Proper density and uniform cell structure.
- Result? You choose wisely and permanently when you specify Terre Haute special foundry coke.

SOLD EXCLUSIVELY BY

REPUBLIC COAL & COKE CO.
WILLOUGHBY TOWER, CHICAGO 3, ILLINOIS

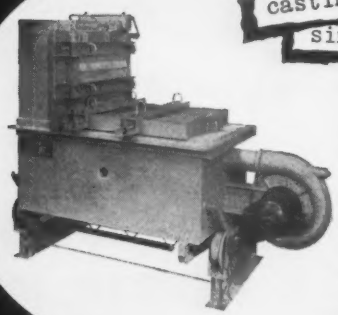
Branches: Peoria • St. Louis • Indianapolis
Minneapolis • Cleveland • New York

Manufactured by: INDIANA GAS & CHEMICAL CORP
Terre Haute, Indiana

Circle 722 on Inquiry Card—Page 209

Here's what Industry has to say about REDA melting Furnaces . . .

nothing but praise for the REDA FURNACE . . .
has improved overall foundry operation . . .
doing a wonderful job . . .
much more flexible . . . entirely satisfactory .
castings come cleaner . . .
sincerely recommend it . .



Reda Stack-Loading melting furnaces for ferrous and nonferrous metals have been designed and built by experienced foundrymen for foundrymen everywhere. That is why Reda furnaces provide advantages far beyond those found in other, and more expensive types; that is why, with Reda furnaces there is less down time for maintenance, longer uninterrupted melting runs, and lower melting costs.

Another feature is the Reda Burner arrangement which can operate from oil and gas simultaneously or be switched from one fuel to the other instantly. *Write or phone for complete details.*

REDA FURNACE
REDA PUMP COMPANY • BARTLESVILLE, OKLA.

Circle 723 on Inquiry Card—Page 209

and demonstrated the Lehigh "Take-A-Break" dispenser for coffee, soup and chocolate.—*R. B. Fischer, Ingersoll-Rand Co.*

Ontario: About 140 members and guests of the AFS chapter met Dec. 21 at the Royal Connaught Hotel, Hamilton, Ont., to honor foundrymen in the area with 25 or more years of service in the industry. Technical speakers were J. H. King, Archer-Daniels-Midland Co. Ltd., V. H. Furlong, Foundry Services (Canada) Ltd., and W. R. Moggridge, Ford Motor Co. of Canada Ltd.

Mr. King outlined the fundamental principles and procedures of the cold setting core process together with its advantages and disadvantages. Mr. Furlong discussed the CO_2 process and illustrated his remarks with a color motion picture on the process which he had taken in various Canadian foundries. Mr. Moggridge spoke on the manufacture of shell cores, the materials and equipment required for the process as well as the savings realized from its use.—*L. H. Burbage, Otis Elevator Co. Ltd.*

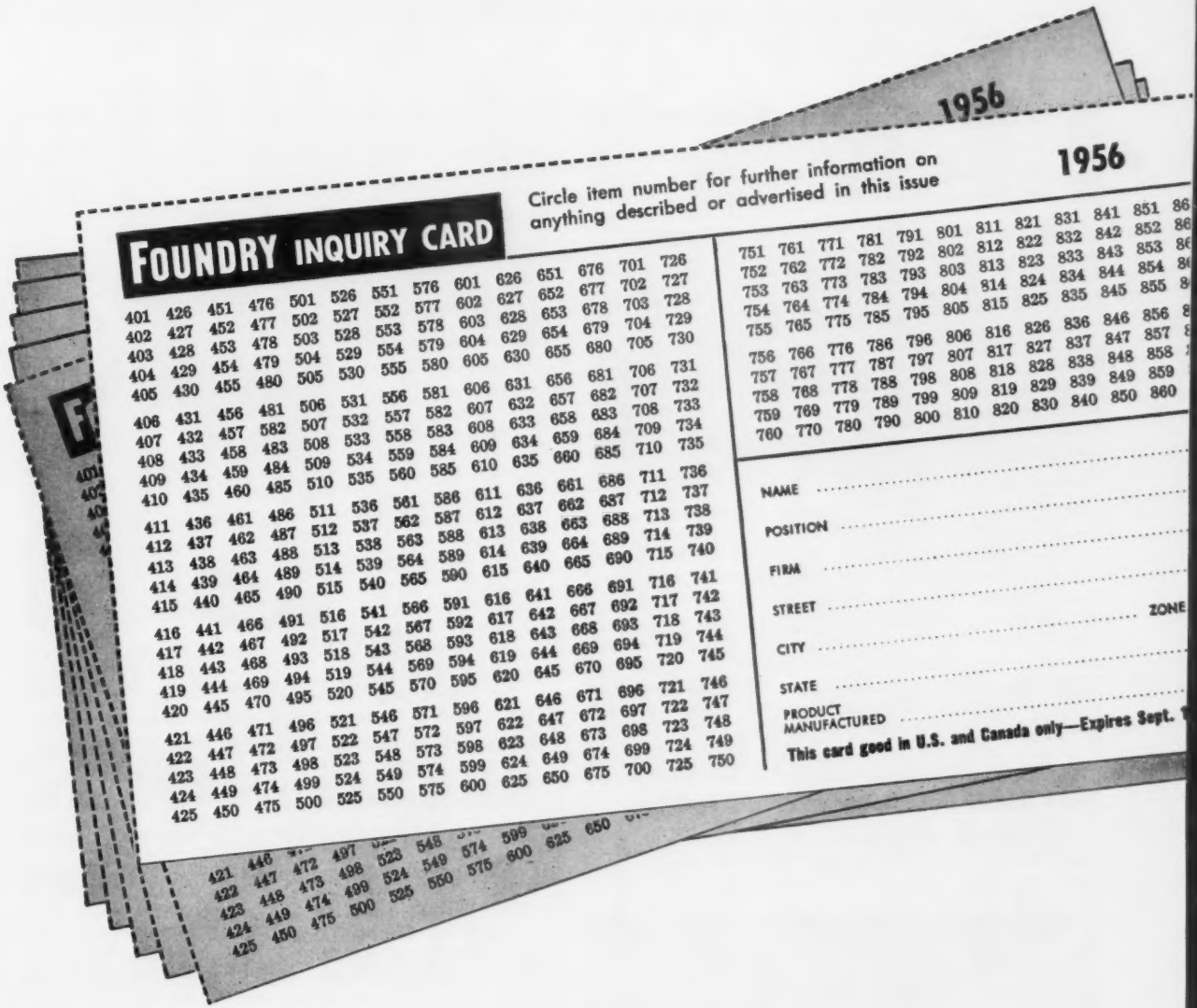
AFS Chapter To Sponsor First In Series of Foundry Seminars

Twin-City Chapter of the American Foundrymen's Society will sponsor the first in an annual series of "Seminars for Foundrymen" at the Mechanical Engineering Bldg., University of Minnesota, Minneapolis, during February. A meeting is scheduled for each of the four Monday evenings. It is the intent of the chapter through these seminars to advance the arts and sciences relating to use and manufacture of castings.

The program has been developed to present a practical down-to-earth summation of sound practices in the modern, scientific foundry. Actual manufacturing techniques will be discussed from the drawing board through metal properties and method to the end use of the piece cast.

Theme of the seminar is "Low Cost Quality Castings" and speakers are Prof. Fulton Holtby, University of Minnesota; H. M. Patton, American Hoist & Derrick Co., St. Paul; M. W. Schroeder, C. W. Olson Co., Minneapolis, and D. B. Fulton, Northern Malleable Iron Co., St. Paul. They will speak on the theme subject as it is applied in gray iron, steel, nonferrous and malleable, respectively.

As space is limited, attendance will be by reservation only and can be obtained by writing J. D. Johnson, Northwest Brass & Aluminum Foundry Inc., 281 Eighth St., St. Paul, Minn.



MORE FOUNDRYMEN are using these handy inquiry cards - - - - to get more information and literature on equipment, products and services described or advertised in FOUNDRY.

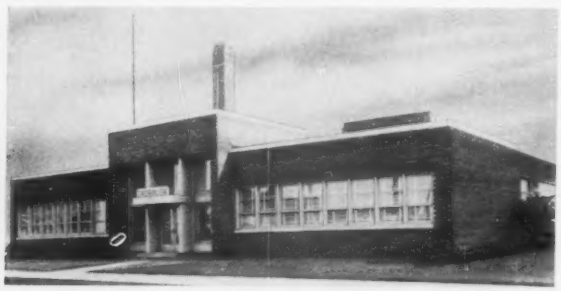
For your convenience - - - - Inquiry Cards will be found in this issue on page 209.

FOUNDRY

The Shakeout

Testing Lab Occupies Former AEC Building

NEW LOCATION of the Frank L. Crobaugh Co. Laboratories at 3800 Perkins Ave., Cleveland, is a modern, fully air conditioned building with 10,800 sq ft of floor



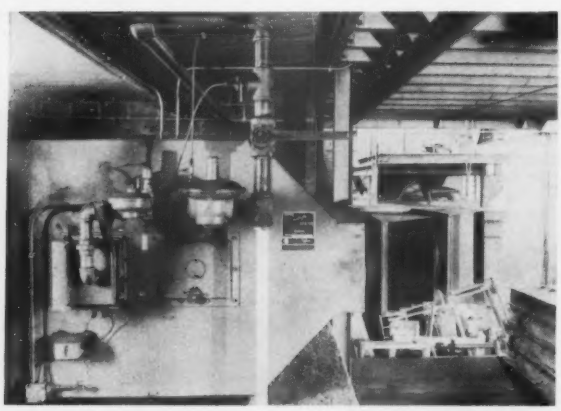
space built by the Atomic Energy Commission during World War II.

A particularly unusual feature of the building is an additional 400 sq ft of underground nuclear laboratory space. Adjoining the building is 21,000 sq ft of parking and future expansion space.

Established in 1894, Crobaugh Laboratories has expanded its operations until they now are worldwide in scope. Spectrographic, x-ray, stress rupture and tensile tests at elevated temperature require instrumentation seldom heard of two or three decades ago.

Space Heater Does Better Job, Cuts Fuel Costs

COST OF FUEL to heat Grant Bros. Foundry Co., Detroit, was cut from $620 to $300 per month by this gas-fired Counterflo space heater manufactured by Dravo



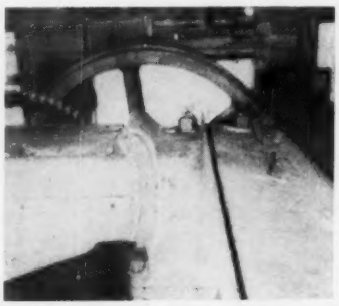
Corp., Pittsburgh. Installed horizontally below the mezzanine floor, or 10 ft above the foundry floor, it discharges 22,000 cu ft of air per minute from its four nozzles and provides a warm blanket of air over the 55 x 160-ft production area. Output capacity of the unit is 2 million BTU per hour. Return air flows back to inlet grilles in the heater base.

In addition to its other advantages, the new space heater does not require manual handling, does not create air turbulence and reduces fire hazards. Grant Bros., which produces castings for the automobile industry, has 65 employees.

For More Details Circle No. 447—Page 209

Weld Repair Saves Nearly $3800

SALVAGE of a $3800 sugar mill casting at a cost of only $26.25 for welding electrodes was accomplished at Helvetia Sugar Co-operative, Central, La., and the casting since has performed perfectly for two grinding seasons. The accompanying illustration shows the outline of the welded area, which required 35 lb of All-State Welding Alloys Co. No. 6 high strength, nonmachinable cast iron electrode.



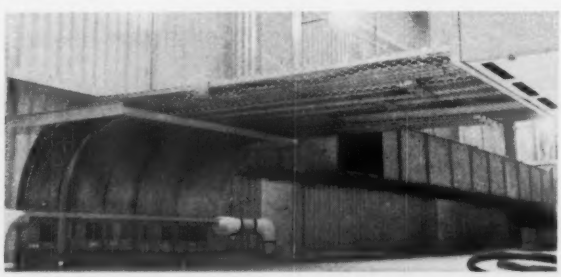
The job was done between grinding seasons and required 40 hours of welding time done over a period of ten days to avoid overheating the casting.

The crack was chamfered with a high speed rod and welded by the company's regular maintenance man. No preheat was used during the skip welding, which was done with beads not over 1½ in. long. Repair was done without disassembly of the machine.

For More Details Circle No. 448—Page 209

Cable Trough Systems Speed Power Transmission

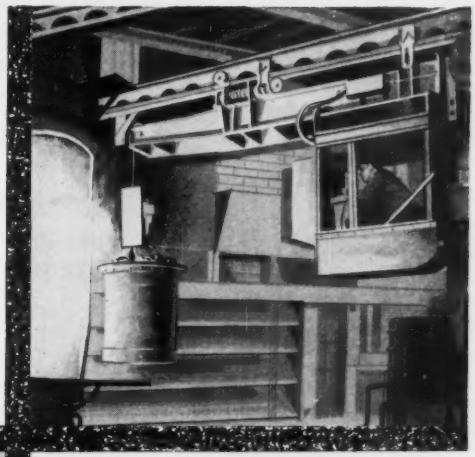
MORE THAN 1¾ miles of Cope expanded metal cable trough has been installed in the Housatonic Plant Tube Mill of Bridgeport Brass Co. at Bridgeport, Conn. The accompanying illustration is a view from the back of the main direct current switchgear and shows power and



control cables leaving for distribution throughout the mill.

Separate trough systems are used for alternating and direct current power cables and for control cables. This arrangement provides complete segregation of various types of wiring, with easy access for changes and ample space for expansion. Other advantages include free air current ratings, compactness and initial cost savings. Bridgeport Brass will use the same system in a new Canadian mill under construction.

For More Details Circle No. 449—Page 209



FOUNDRY INSTALLATIONS

Commercial Contracting Corporation has installed or modernized foundries for all the major automotive producers. Utilize this experience to up-date your own foundry facilities.

Write for information

COMMERCIAL CONTRACTING CORPORATION

GENERAL CONTRACTORS

12160 CLOVERDALE • DETROIT 4, MICHIGAN

Circle 726 on Inquiry Card—Page 209

REJECTS and SCRAP

due to gas are practically eliminated by . . . **Model 400 VACUUM DEGASSING CHAMBER**

A compact, easily operated, entirely integrated foundry unit thoroughly degasses both ferrous and non-ferrous molten metals in a few minutes.

Complete package unit — requires no process changes — occupies small floor space — no special foundation — easily moved — requires no special experience or training.
Built-in lifting device
Ruggedly built for foundry service.

This Vacuum Degassing Unit permits profitable operation from the first day. Write for illustrated bulletin.

CENTRIFUGAL CASTING MACHINE CO.

P. O. Box 947 Tulsa 1, Oklahoma

Circle 727 on Inquiry Card—Page 209

Rips The "Skin" Off The Toughest Finish

FAST!

BLACK BEAUTY

BLAST GRIT

- No silicosis health hazard—safe, clean
- Faster cutting, sharpest material known
- Longer lasting, reusable many times over
- Moisture-free, no packing due to dampness
- Leaves surfaces absolutely clean—no deposits
- Gives highest degree of etch—better bonding

WRITE TODAY for technical brochure covering this NEW low-cost product in full. Six grades available for any degree of etch—specify need

Free Working Sample

(shipped to you at no cost)

Manufactured and Distributed by

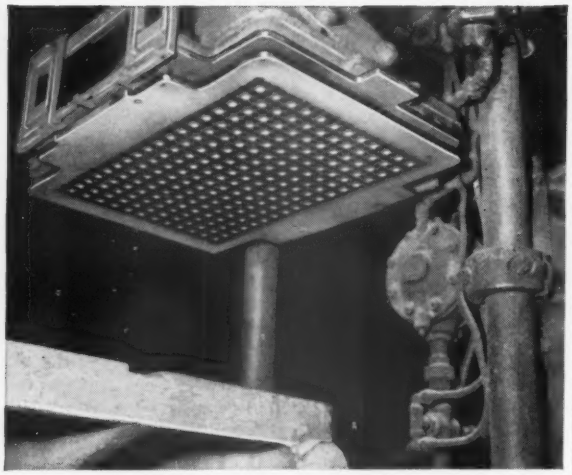
H. B. REED & CO., INC.

6618-N Kennedy Ave., Hammond, Ind.

H. B. REED CORP.

91-N Passaic St., Passaic, N. J.

Circle 728 on Inquiry Card—Page 209



save up to 70% in core blowing with the *new* McKEE-DODGE UNIVERSAL BLOWPLATE*

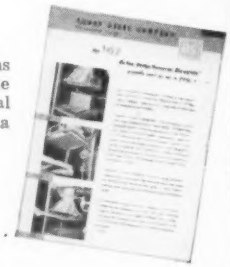
It's a fact! Now you can save time and money in your core operations with this newest Dodge development.

Combining some standard core room practices with new concepts in core blowing, the McKee-Dodge Universal Blowplate offers these plus-value advantages:

- Core rods can be eliminated in most cases.
- Jobs may be transferred from the bench directly to the core blower for increased production.
- Wooden as well as metal boxes can be blown.
- Core blower down time is reduced to a minimum (savings up to 20 minutes in change-over time).

Patent Pending

Bulletin FP-855 contains complete details on the McKee-Dodge Universal Blowplate. Write for a free copy.



DS

DODGE STEEL COMPANY

FINISHED PRODUCTS DIVISION

6501 Tacony Street • Philadelphia 35, Pa.

THE MOST IMPORTANT ALLOY IN A STEEL CASTING IS QUALITY

Circle 729 on Inquiry Card—Page 209

Superior's New HEAVY DUTY AIR HAMMER

Delivers 2200 Blows Per Minute at less than 80 P.S.I.

. . . Yet operates with one Hand

Superior's New Model HD 500 Heavy Duty Air Hammer has a longer stroke, bigger piston and more punch. Used for heavy cutting, chipping, chiseling or grooving—yet it weighs less than 4 lbs., measures 9½" overall. Extremely maneuverable, it keeps operator fatigue at a minimum.

18 Tools Available For 100 Different Jobs

Each tool is specially designed for the HD 500. Patented safety chuck locks tool in six different positions. Blanks available for making tools of your own design.

- Scaling Tool
- Routing Chisels
- Flat Chisel
- Peening Tool
- Finishing & Forming Tool
- Star Drills
- Oil Groove Chisel
- Sheet Metal Cutter
- Panel Cutter
- Spoon Face Chisel
- Gouge
- Wood Chisel
- Wedge Driver
- Paint Scraper

For full details, write Dept. F-2

SUPERIOR PNEUMATIC & MANUFACTURING, INC.

4758 Warner Rd. Cleveland 25, Ohio

Sales offices in Principal Cities

Circle 730 on Inquiry Card—Page 209

FOUNDRY

EDWIN S. CARMAN, INC.

LEE ROAD AT MAYFIELD
CLEVELAND 18, OHIO

A COMPLETE FOUNDRY SERVICE

MECHANIZATION

Circle 731 on Inquiry Card—Page 209

EMPIRE

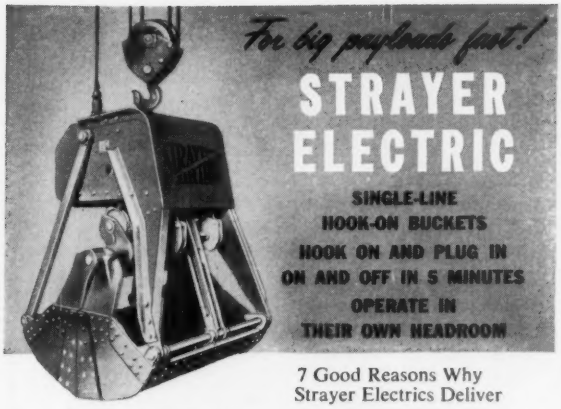
"THAT GOOD"

FOUNDRY COKE

DEBARDELEBEN COAL CORPORATION

2201 First Ave., North • Birmingham 3, Ala.
Phone: ALpine 1-9135

Circle 732 on Inquiry Card—Page 209


For big payloads fast!
STRAYER ELECTRIC
SINGLE-LINE HOOK-ON BUCKETS
HOOK ON AND PLUG IN
ON AND OFF IN 5 MINUTES
OPERATE IN THEIR OWN HEADROOM

7 Good Reasons Why Strayer Electrics Deliver

GREAT CLOSING POWER: Strayer Electric motor driven, combination block and tackle and lever arm action.

DUMPS FULL PAYLOADS: No stiffening plates or braces to collect material.

LONGER CABLE LIFE: Full wrap reeving. No backlash.

NO SIFT-OUT: Positive scoop alignment.

POSITIVE CONTROL: Dig or Dump as much as you like.

COMPLETELY SAFE: Fool-proof power brake.

FAST PARTS SERVICE: Power unit made of standard catalog parts. Quick delivery.

AC—DC MODELS

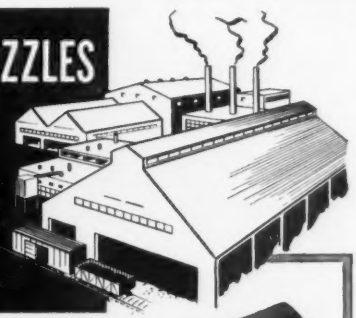
Send for Catalog. Write Dept. F-27

ERIE STRAYER CO.

827 Geist Road Erie, Pennsylvania

Circle 733 on Inquiry Card—Page 209

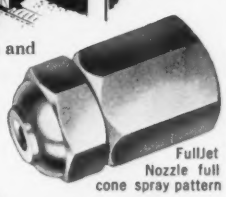
SPRAY NOZZLES
to improve general foundry operations *and increase* product quality



Complete choice of nozzle types and capacities for every foundry need. Typical spray nozzles supplied are:

FOR GAS OR AIR WASHING

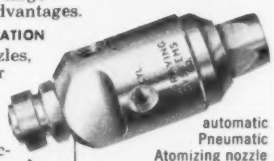
Fulljet or Whirljet spray nozzles in any material or capacity to fit your system. Open internal design and large orifices for non-clogging advantages.



FullJet Nozzle full cone spray pattern

FOR AUTOMATIC MOLD LUBRICATION

Pneumatic Atomizing nozzles, pneumatically actuated for required intermittent operation.



automatic Pneumatic Atomizing nozzle

Made by America's leading designers and manufacturers of industrial spray nozzles.

SPRAYING SYSTEMS CO.
3238 RANDOLPH ST., BELLWOOD, ILL.

•

ADVANCE SPRAY NOZZLE DESIGN FOR NEW DIMENSIONS IN CONTROL AND PERFORMANCE

•

Complete stock of spray nozzles maintained for prompt delivery.

For complete information write for Catalog 24... forty-eight pages of complete nozzle data.

Circle 734 on Inquiry Card—Page 209

COLUMBIA-SOUTHERN

SODA BRIQUETTES® for faster, better desulphurizing

The size and shape of Columbia-Southern Soda Briquettes have been scientifically designed to do a faster, better desulphurizing job in Blast Furnace and Foundry operations.

The walnut form exposes maximum surface area and it is a known fact that such maximum contact is a highly important factor in determining the percentage of sulphur reduction.

Aside from speedy and efficient desulphurization, Columbia-Southern Soda Briquettes accelerate production, increase fluidity, quicken the release of gases and impurities, allow for automatic slag skimming, and improve the refining value of the iron.

Order your supply today by name "Columbia-Southern Soda Briquettes." Packed in 100 lb. paper bags; easy to handle and store.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION
SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY
ONE GATEWAY CENTER PITTSBURGH 22 PENNSYLVANIA

DISTRICT OFFICES: Boston • Charlotte • Chicago • Cincinnati • Cleveland Dallas • Houston • Minneapolis • New Orleans • New York • St. Louis Philadelphia • Pittsburgh • San Francisco

IN CANADA: Standard Chemical Limited and its Commercial Chemicals Division

Circle 735 on Inquiry Card—Page 209

Keller Tool Air Hoist handling flask in a magnesium foundry.

GENTLE yet TOUGH

Easy does it on the lifting. Speed when you want it. Gentle, accurate stops. This lightweight husky (weighs only 28 lb.) will take on lift jobs all day without a whimper. Cannot burn out.

CHECK THESE FEATURES BEFORE YOU BUY ANY HOIST

- **NO BURN-OUT** from overload or stalling.
- **LOW MAINTENANCE** — rugged piston-type motor unaffected by dust or fumes.
- **ECONOMICAL**—uses much less air than other hoists of same capacity.
- **CONTROLLED SPEED**—from creep to maximum.

LET KELLER TOOL AIR HOISTS GIVE YOUR FOUNDRY A "LIFT." Your request for Catalog 86 will bring details in a hurry.

Model	Capacity	Speed	Weight
86-2V20	2000 lb.	19 f.p.m.	78 lb.
86-2V10	1000 lb.	35 f.p.m.	78 lb.
86-1V10	1000 lb.	19 f.p.m.	28 lb.
86-1V5A	500 lb.	35 f.p.m.	28 lb.
86-1V3	300 lb.	80 f.p.m.	28 lb.

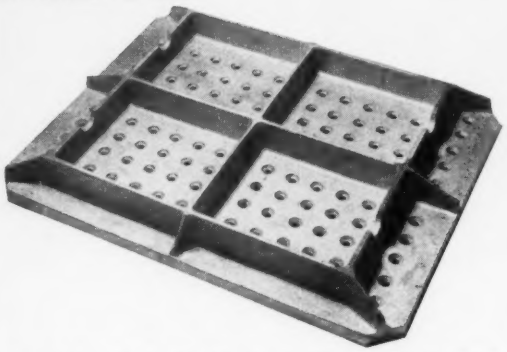
GARDNER-DENVER

KELLER TOOL division, Grand Haven, Michigan

THE QUALITY LEADER IN COMPRESSORS, PUMPS, ROCK DRILLS AND AIR TOOLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

Circle 736 on Inquiry Card—Page 209

NEW ALUMINUM BOTTOM BOARDS



CUT FOUNDRY COSTS

- Will not warp or burn
- Give long lived service
- Eliminate repairs
- Assure uniform molds each cast
- Not affected by weather
- Eliminate stacking problem
- Raised sand strip (optional) around outer edge peens each mold uniformly and eliminates sand slippage
- Rib reinforced for added strength and durability
- Completely cast of aluminum with vent holes on face to permit gas escapement
- Insures better molds at less cost
- Can be furnished with or without sand strip

Write for prices on standard sizes

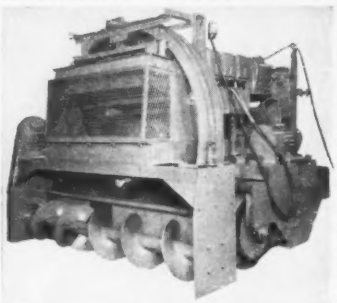
JO-EL COMPANY

14209 Leroy Ave., Cleveland, Ohio

Phone ORchard 1-5787

Circle 737 on Inquiry Card—Page 209

RINGLIFT SAND CONDITIONER



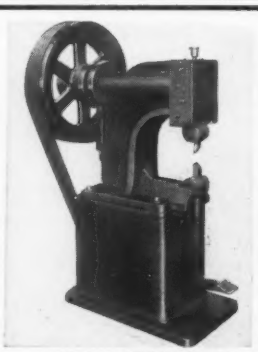
Self-propelled, self-loading, rugged. Liftring utilizes centrifugal force to elevate up to one ton per minute. Larger magnet, correctly applied, does near-perfect separation job.

Mixes, adds water, cools hottest sand by vigorous aeration. 75" headroom. 63" turning radius, straddles windrows. Lowest maintenance.

STATES ENGINEERING CORPORATION

922 W. BERRY ST. FT. WAYNE, INDIANA

Circle 738 on Inquiry Card—Page 209



MILWAUKEE-TESSMER

Sprue Cutter

for

Non-Ferrous Foundries

- Cuts Sprues and Gates with One, Swift, Sure Stroke.
- Does away with tedious hand labor.
- Speeds flow of work through cleaning department.
- Built for years of Rugged, Low-Cost Service.
- 2 Sizes, ¾" and 1¼" square. Built-in electric motor or belt drive.

Write for Illustrated Bulletin

RICE PUMP & MACHINE CO.

222 Park Ave. Belgium, Wis.

Circle 739 on Inquiry Card—Page 209

Master Power

HARD CHROMED • PORTABLE PNEUMATIC TOOLS

DO MORE WORK AT LESS COST

because they deliver more power per cubic foot of air consumed, are light in weight for easier maneuverability and they retain their new tool power longer.

ARE PREFERRED BY OPERATORS

because they are lighter in weight, better balanced and designed to reduce shock and be free from vibration.

IF YOUR PROBLEM INCLUDES

chipping, ramming, grinding, buffing, sanding or wire brushing, *write us today for full particulars.*

THE MASTER PNEUMATIC TOOL COMPANY, INC.

ORWELL, OHIO • U. S. A.

SALES ★ SERVICE ★ STOCK ★ COAST TO COAST

Circle 740 on Inquiry Card—Page 209

FOR AUTOMATIC CIRCUIT-CONTROL

AIRMATIC VALVES

To meet the increasing demand for fully automatic or semi-automatic operations . . . eliminate the need for manual control. Airmatic Valves perform efficiently . . . maintain greater operating speeds. What's more, they are simple and compact in design—assure best arrangement.

A complete line of 2-way, 3-way and 4-way valves available for high-pressure or low-pressure installations.

Three-Way Valve

Solenoid Valves

Cylinders

Write today for complete details about Airmatic Products

Attractive O. E. M. and Quantity Discounts

Delivery from Stock —Immediate

AIRMATIC VALVE INC.

7317 Associate St. Cleveland, Ohio

Cicle 741 on Inquiry Card—Page 209

USE B&A STANDARD OF PURITY

Alkali Fluoborates

Ammonium Fluoborate
Potassium Fluoborate
Sodium Fluoborate

Better Heat Treating

Baker & Adamson Alkali Fluoborates are easily-handled purifying salts which the foundryman can use like precision tools for a wide range of purposes when casting magnesium, or when melting, heat treating or refining aluminum.

Better Castings

When used as a purifying flux in aluminum melting, B&A Potassium Fluoborate improves the mechanical and physical properties of the casting, resulting in increased tensile strength, greater elongation, improved machinability. These results are obtained with the addition of just one to four ounces per hundred pounds of metal.

Excellent Oxidation Inhibitors

In magnesium casting, B&A Alkali Fluoborates are used with both green sand and core sand to provide a protective atmosphere which prevents oxidation. Foundries using these fluoborates have obtained better castings with fewer rejects. Also, core making is easier and the resulting cores are faster to collapse and easier to shake out.

Write or call your nearest B&A Office for full information. Shipment is fast from the nation-wide chain of B&A distributing stations.

GC Allied Chemical

BAKER & ADAMSON® *Fine Chemicals*

GENERAL CHEMICAL DIVISION

Allied Chemical & Dye Corporation

40 Rector Street, New York 6, N. Y.

Offices: Albany* • Atlanta • Baltimore* • Birmingham* • Boston* • Bridgeport* Buffalo* • Charlotte* • Chicago* • Cleveland* • Denver* • Detroit* • Houston* Jacksonville • Kalamazoo • Los Angeles* • Milwaukee • Minneapolis • New York* Philadelphia* • Pittsburgh* • Providence* • St. Louis* • San Francisco* • Seattle Kennewick* and Yakima (Wash.)

In Canada: The Nichols Chemical Company, Limited - Montreal* - Toronto* - Vancouver*

SETTING THE PACE IN CHEMICAL PURITY SINCE 1882

*Complete stocks carried here

Circle 742 on Inquiry Card—Page 209

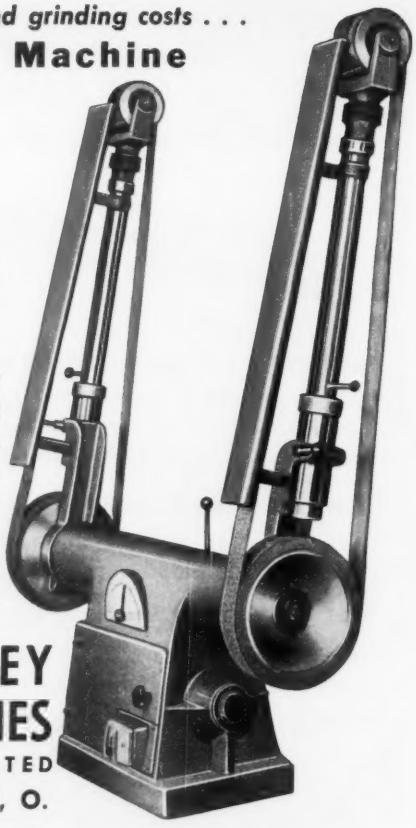
Imported from Germany, specifically designed to cut filing and grinding costs . . .

Filing Machine and Band Grinding Machine

featuring
INFINITELY
VARIABLE
SPEED
TRANSMISSION

★

The filing machine at left is an efficient and economical tool for roughing and smoothing any type of casting, iron, steel, or nonferrous. The band grinding machine at right grinds and polishes by means of contact discs and grinding bands. Both machines have infinitely variable speed transmission. This is an import deal. Ask us about it.



HINCKLEY INDUSTRIES
INCORPORATED
BOX 241 BRUNSWICK, O.

Circle 743 on Inquiry Card—Page 209

No. 4 DAYTON RING VALVE BENCH RAMMER

MORE POWER—MORE SPEED

You'll get more production with these faster, more powerful rammers and at the same time substantially reduce maintenance costs.

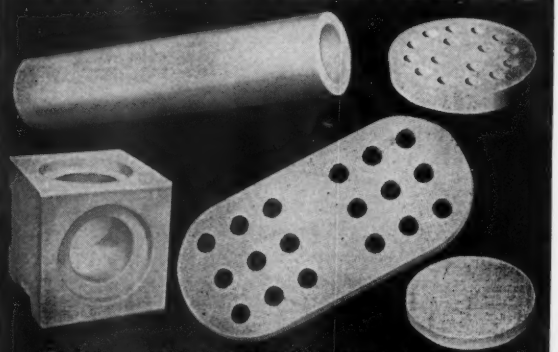
The Valve Units will last for years. The Cylinder Bores and Piston Rods are HARD CHROME PLATED which doubles the life of the Rammer. Many of the largest foundries in the country have already adopted them as standard. Made in six sizes to meet every requirement.

Send for Bulletin 300

DAYTON PNEUMATIC TOOL CO.
Manufacturers of Pneumatic Tools Since 1903
DAYTON, OHIO

Circle 744 on Inquiry Card—Page 209

UNIVERSAL CUSTOM-MADE GATE REFRACTORIES



Get better quality castings with improved gating components. Universal refractory strainer cores, pouring pipes, splash cores and elbows are available in standard sizes or can be custom-made to your specifications. In addition, special strainer cores are available for high-manganese bronze.

Send specifications for price and delivery quotation. No obligation. Phone: SAndusky 4631.

UNIVERSAL CLAY PRODUCTS CO.
1515 EAST FIRST ST. • SANDUSKY, OHIO

Circle 745 on Inquiry Card—Page 209

Improved NI-ROD "55" improves your chances of salvaging castings!

Now better yet! Long preferred for repair of defective castings, Ni-Rod "55"* electrode now teams up *proved* high-nickel core wire with *improved* flux coating.

Handles even better! Ni-Rod "55" electrode is truly *easy*-handling: works in all positions . . . on A.C. or D.C.. You get stable arc . . . smooth bead contour . . . easy slag removal. And there's less chance of chip-off with this electrode's crack-free coating.

Welds even better! The improved electrode produces the remarkably strong and machinable welds that Ni-Rod "55" electrode has always been known for. *Welds that match the color of the cast irons closely.* In addition, Ni-Rod "55" electrode gives even *better* resistance to fusion zone cracking.

Helpful folder — free. "Repair Cast Iron Parts Quickly and Easily" contains illustrated stories of successful welding . . . shows how others simplify cast iron welding with Ni-Rod "55" electrode. A postcard brings your copy. *Registered trademark

INCO Welding Products Electrodes • Wires • Fluxes

THE INTERNATIONAL NICKEL COMPANY, INC., 67 Wall St., New York 5, N. Y.

Circle 746 on Inquiry Card—Page 209

PENN BUCKETS

Careful balancing makes Penn Buckets self dumping when loaded and self righting when empty. Welded construction prevents "clinging" makes them empty easily and completely.

WRITE TODAY FOR NEW BULLETIN AND DIMENSION SHEET

No. 4-A
Self-Dumping

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION MEMBER FEMA

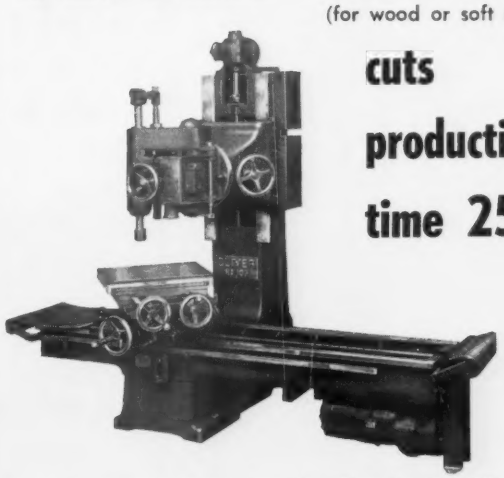
PENN IRON WORKS, INC.
READING, PENNA.

Circle 747 on Inquiry Card—Page 209

OLIVER Pattern Miller

(for wood or soft metals)

cuts production time 25%



In small and large pattern shops the Oliver No. 103 Miller is unmatched for reducing pattern costs. Saves time on small patterns too. It handles an unlimited variety of operations: core box work, grooving, trenching, jointing, routing, gear cutting. Also square bends, S-bends, socket ends, valve boxes, etc. Every cut is accurate within a few thousandths of an inch. Offset head tilts in range of 135°. Has V-belt drive to spindle. Also cuts aluminum patterns. Write for Bulletin No. 103.

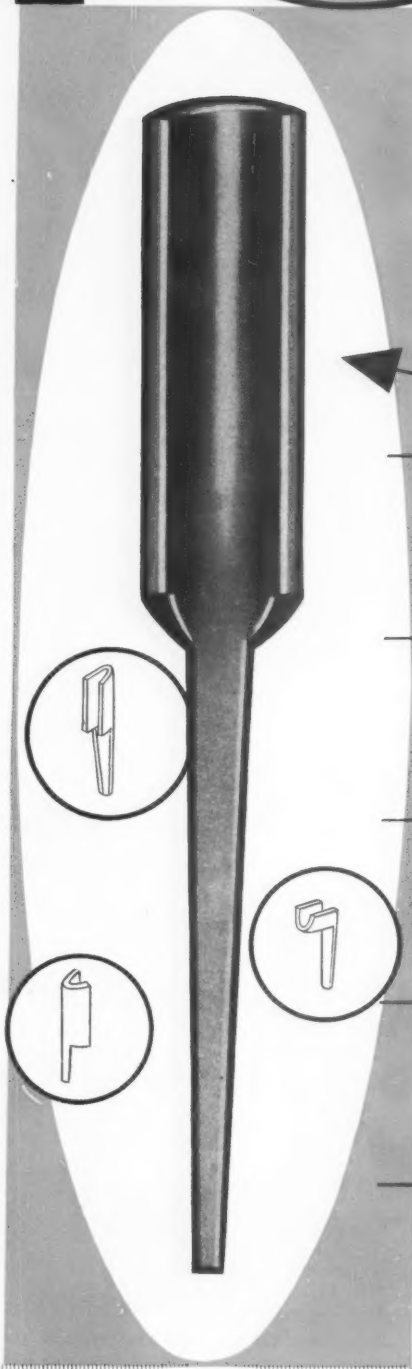
Oliver also makes a larger Pattern Miller and a complete line of woodworking equipment for pattern shops

OLIVER MACHINERY CO., GRAND RAPIDS 4, MICH.

Circle 748 on Inquiry Card—Page 209

FUSET*

CHILL NAILS



Superior Performance through Superior Design!

*** ORIGINAL DESIGN**

First open channel chill embodying scientific principles of mass plus surface. Patented design provides more chill and fusion area.

*** MASS PLUS SURFACE**

Unique combination of two heat-conduction principles permits higher degree of chilling efficiency than ever before obtainable.

*** IMMEDIATE CHILLING & FUSION**

Balanced arrangement of maximum surface with correct cross section thickness transfers heat faster and enables finest possible fusion!

*** IMPROVES QUALITY**

Exclusive channel design permits maximum parent metal fill-in around chill—increases casting strength—allows better control of shrinkage and solidification.

*** LOWERS COSTS**

Less bulk lowers shipping, coppering, storage, plant handling and labor expenses. Fuset efficiency reduces scrap, welding and finishing costs.

*PATENT NOS. 2,731,688, 523,412, 540,053, 1,710,268, 540,688, OTHERS PENDING.
*TRADE MARKS REGISTERED

FUSET* CHILL NAILS ARE MADE IN A WIDE RANGE OF SIZES. EXCLUSIVE FEATURES ARE ALSO AVAILABLE IN FUSERT* CHILLS FOR LIGHT OR HEAVY SECTIONS AND FUSPIDER* CHILLS FOR A LARGE VARIETY OF APPLICATIONS.

WRITE TODAY FOR PRICES AND SAMPLES

CANTON CHAPLET AND CHILL DIVISION
THE W. L. JENKINS CO.
1445 WHIPPLE RD. S. W.
CANTON, OHIO

CLASSIFIED ADVERTISING

Help Wanted

REFRACTORIES
SALES ENGINEERS

ENGINEERS (Ceramic, Chemical, Metallurgical, or Mechanical) with 3-5 years of production or development experience in ferrous or non-ferrous metal processing:

Rapidly expanding Refractories Division offers promising opportunities working on the application of new high-temperature refractories.

Location—Worcester, Mass.

Send Resume to Mr. T. S. Green
Assistant Manager of Personnel

NORTON COMPANY
Worcester, Mass.

Refractories • Abrasives • Grinding Machines

FOUNDRY
METALLURGIST

Exceptional opportunity exists for an experienced and creative foundry metallurgist to work on challenging research projects. This is an assignment where a man with real ability can advance in a rapidly expanding organization. Attractive salary and liberal benefits including tuition free graduate study and generous relocation allowance. Send resume to:

J. A. METZGER
ARMOUR RESEARCH FOUNDATION
of Illinois Institute of Technology
10 West 35th St.
Chicago 16, Illinois

DESIGNERS-DRAFTSMEN-ENGINEERS

Experienced in foundry layouts and equipment. Send experience record, personal data, recent photo and reference prior to personal interview.

BOX 450, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

FOUNDRY ENGINEER

Medium-size gray iron production jobbing foundry wants qualified young man for trouble shooting, estimating, gating and layout, as well as special projects working directly for chief executive. Challenging work and excellent opportunity for ambitious man. Furnish complete details including age, weight, height, experience, education, salary desired and references. Address: Box 451, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

ALUMINUM DIE CASTING MANAGER

To assume full responsibility for the management, growth and development of the Die Casting Division of a large Eastern foundry. An excellent opportunity for a man thoroughly familiar with all phases of the die casting business to become an integral part of this business and share in its profits. Address: Box 445, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY FOREMAN

For Northern Ohio gray iron foundry employing 45 men on jobbing work. Opportunity for ambitious young man to supervise molding and coremaking. Send complete resume including age, weight, height, experience, salary desired, references, etc. Address: Box 453, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY TECHNICIAN OR
QUALITY CONTROL
ENGINEERING ASSISTANT

Mechanized gray iron foundry in Ohio producing quality engineering jobbing castings. Applicant should have some technical background, training or experience in one or more of the following fields—Metallurgy, Cupola Control, Sand Control, Gating and Risering.
This position will offer many opportunities in increasing efficiency and control of all foundry operations including practical research, development and application on new foundry processes such as shell process and CO_2 process. Earnings will be dependent on qualifications and ability.

BOX 399, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

MALLEABLE IRON
FOUNDRY SUPERINTENDENT

An Ohio malleable iron foundry is interested in employing a foundry superintendent who is experienced in malleable iron jobbing operation. Please forward resume of qualifications, experience, references and salary requirements.

BOX 443, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

FOUNDRY SUPERINTENDENT

Gray iron foundry in Southeastern Wisconsin. Real opportunity for the right man. Do not apply unless you are thoroughly qualified to take complete charge of foundry operations. Give full detailed list of experience.

BOX 437, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

ALUMINUM PERMANENT
MOLD MANAGER

For large, established Eastern foundry. Will consider only highest caliber men who are thoroughly familiar with technical aspects of permanent mold casting and have the leadership and management ability to assume responsibility of plant operation at top management level. This is a real opportunity for a man with the right qualifications to become part of and share in the profits of a growing organization. Send complete resume. Confidential. Address: Box 444, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

MALLEABLE FOUNDRY EXECUTIVE

Malleable foundry, 400 employees, interested in man with knowledge of all phases of foundry operations for position as superintendent. Write stating full qualifications, experience, references and salary desired. All replies held confidential. Address: Box 470, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

PERMANENT MOLD
DESIGN ENGINEER

Must be capable of heading up department as well as designing molds. Address: HAMPDEN BRASS & ALUMINUM CO., 262 LIBERTY ST., SPRINGFIELD 1, MASS.

LAYOUT MAN

For metal pattern shop. Paid vacations and holidays. Steady employment. PROCESS PATTERN & ENGINEERING CO., INC., 1707 N. HARRISON ST., FORT WAYNE, INDIANA.

Help Wanted

FOUNDRY EQUIPMENT ENGINEER

Prominent Ohio manufacturer of foundry equipment needs an ambitious and aggressive engineer, with technical foundry experience, to serve as liaison man between engineering and production. Duties to include planning and supervision of assembly operations on standard and automation equipment. An exceptional opportunity—in an expanding industry. In replying, include resume of education, experience, availability and salary requirements.

BOX 462, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

METALLURGIST

Required for nonferrous mechanized foundry manufacturing brass valves, pipe fittings, plumbing supplies, etc. Experience on Detroit electrical furnaces, and some knowledge of synthetic sand technique an advantage. Will be responsible for metal analysis, furnace room alloying and melting. Must be capable of setting up test laboratory and organizing metal control methods.
Reply in confidence stating age, experience, and salary requirements.

EMPIRE BRASS MFG. CO., LIMITED
LONDON, ONTARIO, CANADA

GENERAL MANAGER

For nonferrous foundry in Milwaukee area. Must be progressive, able to handle sand centrifugal permanent mold castings.
State age, experience and salary expected. Excellent opportunity for right man.

BOX 460, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

METALLURGICAL ENGINEER

Excellent opportunity for young metallurgist in medium-size midwest jobbing foundry. In addition to increasing efficiency and control of standard foundry operations, position would offer opportunity for practical research and development of new foundry processes.

BOX 455, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

METALLURGIST

Semi-mechanized gray iron foundry in the middlewest has opening for a metallurgist. Immediate duties sand and metal control. Chance for advancement into managerial position in progressive and expanding foundry. Address: Box 432, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOREMAN—NONFERROUS

To take charge of a modern foundry producing ornamental, architectural and tablet castings in bronze and aluminum. Able to work along with and direct molders. Good opportunity for right party. State age, experience and salary desired in confidence. Address: Box 427 FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

METALLURGIST

Well established midwest malleable iron foundry seeks experienced metallurgist. Excellent opportunity. Submit resume of education, experience and state salary requirements. Address: Box 400, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

CLASSIFIED ADVERTISING

Help Wanted

QUALITY CONTROL MAN

Prefer man who is technical graduate in mechanical or metallurgical engineering with experience in casting and machine shop practice. Capable of heading machine shop and finished products inspection, purchased material inspection. Will be expected to make trips to casting and finished products customers' plants. Excellent opportunity with well-established company in the midwest.

BOX 428, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

PRODUCTION CONTROL SUPERVISOR

Prefer man with steel and gray iron background. Must have experience in setting up control programs. Well-established company in the midwest. Send complete resume of past experience and salary requirements.

BOX 429, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

ASSISTANT FOUNDRY SUPERINTENDENT

Want modern, control-minded Assistant Superintendent for Midwest Malleable Foundry producing mechanized and semi-production jobbing castings. Must think ahead and participate in modernization program while improving quality and reducing costs. Real opportunity and challenge at adequate salary and bonus. Reply giving personal data and salary requirements.

BOX 449, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

STEEL FOUNDRY METALLURGIST

Leading steel foundry located in the Middle West with 500 ton capacity, has opening for a qualified metallurgist.
Must be a technical man of proven ability, and able to direct Metallurgical Department.
Submit data covering experience, education, age, references and salary range, etc. All replies confidential.

BOX 442, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

SALES SERVICE ENGINEER

Wanted by progressive producer of foundry supplies. This is a real opportunity for young foundry engineer with experience in sand and/or melting practices. College education is desirable. Ability to learn and develop is essential. Send complete record. Address: Box 472, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

GRAY IRON FOREMAN

Small gray iron foundry in midwest needs a general foreman to take complete charge of operations. Must be experienced in floor work as well as squeezer and large machine production. In reply give age, experience and references. Address: Box 403, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

METHODS ENGINEER

With production and jobbing gray iron foundry experience. Good opportunity for right man in a progressive medium-size gray iron midwestern foundry presently modernizing. Address: Box 431, FOUNDRY, Penton Bldg., Cleveland 13, O.

CORE ROOM FOREMAN

Small jobbing malleable foundry in Ohio, applicant must be able to estimate core weights and core prices from blueprints. Submit qualifications, salary desired. Address: Box 457, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

GRAY IRON FOREMAN

Gray iron jobbing foundry near Cleveland needs a dry sand foreman for medium and large floor work. In reply give age, experience, references and include photograph. Address: Box 454, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Employment Service

FOUNDRY PERSONNEL SPECIALISTS
National Placement and Procurement of

GENERAL AND PLANT MANAGERS, PLANT SUPERINTENDENTS, FOREMEN—ALL DEPARTMENTS, METALLURGISTS, ENGINEERS, CONTROLLERS, ACCOUNTANTS, SALESMEN, SALES MANAGERS, PERSONNEL DIRECTORS, PURCHASING AGENTS

Confidential Inquiries Invited
From Employers and Qualified Applicants.

For Fast Competent Assistance Contact
DRAKE PERSONNEL, INC. HARRISON 7-8600
JOHN COPE, DIRECTOR 220 SOUTH STATE ST., CHICAGO, ILL.

Positions Wanted

FOUNDRYMAN

45 years old, 15 years' experience, 9 years in sales and service. Supervisory experience on latest automatic molding units and all phases of foundry operation. Know cupola, air furnace, sand control, and rigging. Will consider traveling or superintendent position in gray iron or malleable foundry. Presently employed as trouble shooter. Address: Box 436, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRYMAN

Twenty-eight years' practical technical experience all phases of operation, ferrous or nonferrous. Capable, aggressive, assume full charge. California or southwest. Resume on request. Address: Box 465, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SUPERINTENDENT

Practical, technical background. Light and heavy, green and dry sand. Cupola operation, cost conscious, jobbing and captive. Last place 18 years, foundry superintendent, technical foundry advisor, liaison man between machine, pattern shop and casting buyer. Address: Box 420, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

MECHANICAL ENGINEER

Age 28, married, six years' diversified engineering experience. Desire to learn foundry business from ground up. Business-minded, adaptable, conscientious, quick to learn. Complete resume on request. All replies acknowledged and held in strict confidence. Address: Box 433, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

METALLURGIST

Six years' experience in gray iron as melting and sand control supervisor. Degree B.S. in Metallurgical Engineering. Age 35. Desire position of responsibility offering opportunity for advancement. Address: Box 435, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRYMAN

Gray iron or nonferrous. Familiar with every phase of the foundry, background of practical and technical experience. Now employed as superintendent. Address: Box 419, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SUPERINTENDENT

High frequency induction furnace superintendent, fourteen years' experience. Production, stainless steel and alloy castings, twelve years analytical chemist. Diplomas in Metallurgy. Address: Box 447, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SUPERINTENDENT OR MANAGER

Progressive foundryman familiar with every phase of practical experience on all classes of work. Now employed. Would like to make change. Address: Box 426, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

MANAGER

Practical and technical trained foundryman. Age 45. Well versed in every department of ferrous jobbing shops, on castings up to 30 tons. Excellent labor relations. Cost and quality minded. Now employed. Address: Box 466, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

CORE SUPERINTENDENT

Age 46, graduate apprentice, fifteen years in core supervision. Expert knowledge in core blowing, bench and rollover machines, also dry sand assemblies. California preferred. Will consider others. Employed. Address: Box 471, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

TECHNICAL EXECUTIVE

Met. E., M.S., capable of coordinating all technical departments of a gray iron or malleable foundry. Eighteen years' experience in operations: process engineering, quality control, metallurgy, sand control, research and development, sales and service, and technical training. Address: Box 458, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

ANALYTICAL CHEMIST

Six years' experience and training in melting, sand control and laboratory work in ferrous industry. Desire position with opportunity. Presently employed. Resume on request. Address: Box 469, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

WORKS MANAGER-SUPERINTENDENT

Capable of operating a 350 man organization. 23 years of experience in casting ferrous and nonferrous metals in sand, permanent and investment molds profitably. Address: Box 398, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Thorough knowledge of all phases of nonferrous metals. Understand gating, jobbing, floor, machine and plumbers supplies. Can also produce pressure tight and porous free castings. Know sand control and core room work. Address: Box 448, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Thoroughly versed in all phases of ferrous and nonferrous foundry operations. Capable of producing efficiently and profitably. Address: Box 464, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

ELECTRIC FURNACE MELTER

Eighteen years' experience acid and basic practice on castings and ingots. A-1 references. Address: Box 463, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Open Capacity

WANTED—NEW PRODUCT OR SUBCONTRACTING

Light to medium steel fabricating plant located in the Milwaukee area, with a diversified foundry following, is looking for new products, or have open time and space available for subcontracting connections. Equipment includes automatic and hand screw machines, light to medium punching, bending, and shearing tools, automatic and manual arc welders, plus precision tooling such as drill presses, lathes, planers, and planer type mill. Address: Box 434, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

OPEN CAPACITY

We have open capacity and solicit your inquiries for gray iron castings, ranging in weight from 500 pounds to 15,000 pounds. Quality castings produced under close metallurgical control. Address: Box 411, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Representative Available

AGENCY SEEKS TO REPRESENT

Capable, hard-working salesman, currenty representing a nonferrous ingot smelter seeks to represent exclusively a reliable gray iron or malleable iron foundry for eastern Pennsylvania and New Jersey. Address: Box 441, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Foundry Consultant

ELECTRIC FURNACE CONSULTANT
BASIC AND ACID PRACTICE

Supervisor on electric furnaces for 35 years. Thorough knowledge of:

1. All kinds of plain carbon and alloy steel.
2. Analysis control.
3. High standard of physical properties.
4. Low Cost with high productivity.

EUGENE H. WEAK 2933 HIGHWAY AVE.
HIGHLAND, IND. PHONE: TEMPLE 8-1244

Representatives Wanted

REPRESENTATIVES WANTED

We are changing our sales policy and are interested in discussing the sales of our melting furnace equipment with representatives in various districts outside of New York and Chicago. We manufacture a complete line of gas and oil non-ferrous melting furnaces in all sizes and types.
Also interested in a salesman for our home office.

STROMAN FURNACE AND ENGINEERING COMPANY
9900 FRANKLIN AVENUE
FRANKLIN PARK, ILLINOIS

MANUFACTURERS' AGENTS WANTED

To handle well-established repeat supply item sold to pressure die casters. Leader in its field. Splendid earnings opportunity with a product that is a "household name" in the die casting industry. Give full details concerning lines handled. We are especially interested in frequency of contact you now have with pressure die casters. Address: Box 459, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SALES REPRESENTATIVES

Large nonferrous sand and permanent mold foundry interested in commission salesmen in Illinois, Indiana, Missouri and Michigan. Replies confidentially treated. Personal interviews upon request. Write resume of experience. Address: Box 439, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

REPRESENTATIVES WANTED

Manufacturers' Representatives or Dealers wanted. Territories now available for Reda Melting Furnace designed for ferrous or nonferrous metals. Aggressive selling outlets calling on foundries desired who want to handle profit making furnace on a commission basis. Write or call: FURNACE DIVISION, REDA PUMP COMPANY, BARTLESVILLE, OKLAHOMA.

REPRESENTATIVE WANTED

Production aluminum and brass sand foundry in Wisconsin wants representation in Detroit area. Experienced man preferred. Liberal commission basis. Address: Box 461, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

MANUFACTURER'S REPRESENTATIVE

For investment casting company. Now handling similar lines. Good territories open. Strongly competitive on price and delivery. Address: Box 446, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

REPRESENTATIVE WANTED

Manufacturer's agent to sell quality gray iron castings. Address: Box 412, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Foundries For Sale

FOUNDRY FOR SALE

Highly rated concern, established 26 years, operating one foundry and taking complete output of two others for sale. Making waterworks fittings and shipping nationally. Profit over one hundred thousand annually and expanding. Six acres of land and over 200,000 square feet of brick and steel buildings. Owner wishes more leisure time but will stay on until relieved. Price $400,000, with about one-fourth cash or will consider part investment and balance on contract over ten years. Low labor cost and no labor trouble. Located city of ten thousand in Southern Indiana. Zoned out of city limits for low taxes.

BOX 410, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

GRAY IRON, BRASS, AND ALUMINUM

Small foundry located in fast growing market. Six ton daily capacity. Modern Equipment. Can be financed. Address: CLEMMONS MANAGEMENT, 4108 DENNIS, HOUSTON 4, TEXAS, PHONE CAPITAL 3-4527.

Foundry Wanted

WANT TO BUY

Interested in buying a small to medium-size foundry producing Niresist, Nihard and similar heat, corrosion and abrasion resistant castings. Please submit complete details in first letter in strict confidence. Address: Box 452, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Opportunity

PERMANENT MOLD METHOD AVAILABLE THE WAGNER PERMANENT MOLD CO., 2910 Empire Ave., Burbank, California, has developed a Permanent Mold Method for ferrous and nonferrous metals and invites inquiries from any country regarding this method and process.

OPPORTUNITY

I have a ferrous and nonferrous jobbing business using hundreds of my own patterns. This business can be developed to do three to five times the present volume. To handle the present volume I need help, and will sell all or part to the right party. The business can be learned in thirty days if you are mechanically inclined or have had experience in machinery or hard goods. This is not a foundry, it is a warehouse. This business can be moved to any geographical point of advantage to the owner. Address: Box 438, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

OPPORTUNITY

Owner of well-known revolutionary fast metal melting furnaces wishes to connect with responsible firm to manufacture and sell on royalty or will sell patents. Hundreds installed satisfactory. Address: Box 456, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

OPPORTUNITY

Would you welcome extra income? Are you calling on metal-working industries? Then our new technical information service indispensable to plant engineers and management is your answer. To start, write at once with details. Address: Box 430, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

C. W. AMMEN
8651 GREENLEAF AVE.,
BUENA PARK, CALIF.

Invites inquiries from anyone U.S. or foreign as to his specially developed tapespondence consulting service in all phases of the nonferrous foundry operations.

Wanted-To-Buy

WANTED

Osborn #720PJ Jolt Squeezer Strip
or #721PJ Jolt Squeezer Strip.

BOX 473, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

WANTED

Centrifugal casting machine for red alloys. Must have mold equipment up to 16" diameter. Give full details in first letter.

BOX 404, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

WANTED

Used rack type core oven, gas fired recirculating type; inside size approximately 60" wide, 6' high and 6' long. State condition and price. GEM CITY PATTERN CO., 1001 OHIO ST., QUINCY, ILLINOIS.

WANTED

Melting furnaces, tilting type, gas and oil fired; Mullers: Simpson, Beardsley & Piper, Clearfield, all sizes. Prompt reply appreciated. Address: Box 467, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

WANTED

Used indirect-arc electric furnace, Detroit Electric, type IC, PT, or NP; 10-17 lb. capacity. 220 volt. Address: BOX 440, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price or immediate acceptance. Address: Box 578, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

WANTED TO BUY

Good used sand blast equipment, suitable for cleaning large and small aluminum castings. State make, age, price, size and condition in first letter. Address: NEWARK ALUMINUM CASTINGS FOUNDRY, 96 WALDO STREET, NEWARK, OHIO.

HAVE YOU EVER NOTICED the numerous types of headings under which classified ads are listed? Whether interested in obtaining qualified personnel, selling used machinery, wanting to buy equipment, or are yourself looking for a better position, you should seriously consider advertising in the classified section of FOUNDRY MAGAZINE.

•

FOUNDRY has 45,000 readers which cover the entire foundry industry. That means that for a nominal sum you get the widest possible coverage of the industry and your advertisement reaches "just the right people".

•

The Classified Staff is equipped to handle all details in the placement of your ad.

Classified
ADVERTISING DEPT.
FOUNDRY
CLEVELAND 13, OHIO

CLASSIFIED ADVERTISING

For Sale

GUARANTEED
MACHINES
AT LOWEST PRICES

MILWAUKEE MODEL 103 10" SQ. 16 x 20; 4⅛" JOLT DIA. $125.00 EACH

JOLT SQUEEZE
STRIP MOLDING MACHINES
213 SPO; 4½" jolt; 13" squeeze
2114 SPO—11" sq.
2136 SPO—13" sq.
720 U Osborn—11" sq.
International PKL—14 x 5½

JOLT ROLLOVER
MOLDING MACHINES
Tabor—30" x 40"; 12" draw; shockless—1000# cap.
2047 Osborn; 18" x 24"; stationary
601 Osborn; 30" flask
602 Osborn; 36" flask
605 Osborn; 54" flask

JOLT SQUEEZERS
275 J Osborn; 16 x 20; 10" sq. cyl.
276 J Osborn; 17 x 26; 13" sq. cyl.
113 J SPO; 17 x 26; 13" sq. cyl.

CORE BLOWERS
Redford Core Blowers
#193 Osborn for medium cores
#94 Osborn—for large cores

MATERIAL HANDLING EQUIPMENT
Model HA Hough Payloader
Clark Fork Lift Truck—6000 lb. Gasoline
Clark Fork Lift Truck—5000 lb. Electric—with battery
Elwell Parker Fork Lift Truck—4000 lb. Gasoline
Mercury Fork Lift Truck—2000 lb. Electric
Lewis-Shepard Platform Lift Trucks

FURNACES
2000 lb. Stroman—Tilting Hydraulic
2000 lb. Fisher—Aluminum
350 lb. Detroit Rocker Barrel—Complete

CORE OVENS
Dielectric—Model 900A and 1800A. Set up in your shop in operating condition. Less than one-half price.
Despatch Core Oven—Batch type—8' square complete with all controls.

MISCELLANEOUS
FOUNDRY EQUIPMENT
Roller conveyor, 3" channel iron; 2½" rolls; 6" on center; ⅜" above rail, 3000 ft.
U.S. 7½ HP 3 speed grinders; 28" wheel
Model S Screenerator—B & P
Climax Wire Straightener
Model AA American Sandcutter
Jib Cranes—2 ton capacity
Electric Hoists—2 ton capacity
#42 Osborn Hand Rollovers

REPAIRS ON ALL MAKES OF AIR TOOLS.
For the Best Deal Call
BALCHER MACHINERY COMPANY
695 E. 152nd STREET CLEVELAND 10, OHIO
TELEPHONE: GLENVILLE 1-2474

FOR SALE
TURBO BLOWERS WITH MOTORS

CFM	PRESS.	MAKE	CFM	PRESS.	MAKE
8375	20oz.	Spencer	340	20oz.	A-B
6000	32oz.	Ing.-Rand	320	12oz.	Spencer
4700	32oz.	Ing.-Rand	9000	6"SP	Northern
2500	7oz.	Sturt.	3420	8"SP	N.Y.
1300	16oz.	Spencer	2700	⅝"SP	Ilg
800	13oz.	Buffalo	2500	½"SP	American
400	12oz.	Buffalo	1100	4½"SP	Bayley
450	7oz.	Spencer	2344	2"SP	Clarage
400	16oz.	No.Am.			

THE MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVE.
CLEVELAND 14, OHIO

For Sale

URGENTLY NEEDED
Small Wheelabrators or Pangborn TumBlast, or Table Blast. Will pay cash or will give tremendous trade in value on any of the Sand Blast Equipment listed below:
Pangborn E.S. 347 Conveyor Cabinet, 4 throwing wheels, used for blasting motor blocks, a beauty, can be seen in operation.
Pangborn 14 GK" Rocker Barrel
48 x 48 Wheelabrator TumBlast
42 x 48 Wheelabrator TumBlast
36 x 42 Wheelabrator TumBlast
27 x 36 Wheelabrator TumBlast Rubber or Steel Belt
15" Continuous Wheelabrator TumBlast
8' Wheelabrator Table Blast
6' Wheelabrator Table Blast
Vapor Blast Cabinets, singles and doubles
All types and sizes of Hand Cabinets, Dust Collectors, Pressure tanks, Rooms, Horizontal or Vertical Tumbling Barrels and additional Sand Blast Equipment too numerous to mention.
DIAMOND SALES, INC.
5654 W. JEFFERSON DETROIT 9, MICH.
VI 36750
WE WILL BUY ONE PIECE OR YOUR ENTIRE PLANT.

FOR IMMEDIATE SALE
COLEMAN TOWER CORE OVEN

With gas-fired heating system and forced cooling system. 9'2" x 8'8" x 30'0" high above floor and 7'0" below floor. 1,000,000 BTU/hr heating capacity. Automatic temperature control. 24 conveyor driven carriers 20" wide x 72" long x 26" high, each with four adjustable shelves. Used approximatetly 7 years.

AMERICAN RADIATOR & STANDARD
SANITARY CORP.
7TH & ESSEX STREETS
P.O. BOX 1312
RICHMOND, CALIFORNIA
PHONE: BEacon 3-1542

FOR SALE

1—Shell-O-Matic automatic shell mold machine, Model 2026-L, complete with louvres.
1—Shell mold sealing press.
1—SPO double oven shell core machine.
1—Beardsley & Piper Model 30 A Speedmuller.

THE ARTH BRASS & ALUMINUM
CASTINGS CO.
1372 EAST 33RD STREET
CLEVELAND 14, OHIO

FOR SALE

1—AJAX-TAMA WYATT INDUCTION FURNACE, never used stationary type BS1, c/w controls and installation tooling for melting and holding aluminum alloys. Rated 35 KW, 460V, 60 cycles. Price $4,500.

OREGON METALLURGICAL CORP.
P.O. BOX 311
ALBANY, OREGON
WABASH 6-2273

FOR SALE

1—Simpson Mixer, #2, 20 HP motor.
Miscellaneous: Screens, Pulverizers, Grinders. Tyler Rotap Screens etc.
Wanted: Your Idle Machinery.
OUR 39th YEAR
CONSOLIDATED PRODUCTS CO., INC.
66 BLOOMFIELD STREET
HOBOKEN, NEW JERSEY
OL 9-4425 N. Y. TEL. BA. 7-0600

FOR SALE

Four Osborn Model 2047-3 Rollover jolt molding machines, serial #10867-BN. Core box 21¼ x 22¼, flask space 11⅛", pattern draw 8". Never used.

TRIPLEX MACHINE TOOL CORP.
75 WEST STREET
NEW YORK 6, NEW YORK

MOLDING MACHINE

Herman 6000# capacity, jolt-roll-draw in operating condition. Asking $2900 f.o.b. Address: POTTSTOWN MACHINE CO., POTTSTOWN, PA. (Phone 37, H. H. Houston).

SURPLUS EQUIPMENT

Several Osborn jolt squeeze molding machines #274-J and 275-J. Address: ATLANTA STOVE WORKS, P.O. BOX 54, STATION E, ATLANTA, GEORGIA.

For Sale

PRODUCTION TYPE SHELL MOLD MACHINE

Completely automatic Sutter 20 x 30 inch pattern plate. A War Horse for continuous production but allowing for quick pattern changes. Fully push button controlled giving operator time to set cores, seal and complete molds, ready for pouring. Each cycle can be individually timed to your needs. Machine is equipped with gas shell baking oven and either gas or electric pattern heat. Sold either with or without Selas Type 60-C-3 gas compressor and mixer with 3 h.p., 220 volt, 60 cycle motor. A new machine would cost over $17,000.00.
Any reasonable offer considered. Will sacrifice. Offered subject to prior sale.

Phone, Wire or Write:
KENCROFT MALLEABLE CO., INC.
373 HERTEL AVENUE
BUFFALO 7, NEW YORK
PHONE: RIVERSIDE 1520

FOR SALE
NEVER USED AIR HOISTS
INGERSOLL-RAND

One ton and two ton, packed in original crates.

Save up to $175.00 each.

HOMAN MACHINERY CO.
824 REEDY STREET CINCINNATI 2, OHIO
MAIN 1-4634

FOR SALE
MOTORS—GENERATORS
TRANSFORMERS
Unused — Rebuilt
WORLD'S LARGEST INVENTORY
ELECTRIC EQUIPMENT COMPANY
Phone Station Collect GLenwood 3-6783
P.O. Box 51—Rochester 1, New York

FOR SALE

Lectromelt 250 lb. type "U" side charge electric furnace. Complete, good condition.

BEAVER VALLEY ALLOY FOUNDRY CO.
MONACA, PENNSYLVANIA

FOR SALE

One (1) never used #0 Whiting Cupola, fired for two hours. Make offer.

JEFFERSON FENCE & SUPPLIES MFG., INC.
1060 W. JEFFERSON AVE.
TRENTON, MICHIGAN

FOR SALE

One Eclipse Fuel Engineering reverberatory furnace, Model F2000G, gas fired, maximum 9,450,000 B.T.U. input. Melting rate 2,000# iron, or 1800# aluminum or 2200# brass per hour. Air operated tilting device. Never used, on original skids, serial #30934. Will sacrifice at $4,000.00. Address: THE WADSWORTH FOUNDRY CO., WADSWORTH, OHIO.

FOR SALE

Room type Pangborn shot blast, 11' x 10"—7'6" high, with double doors 6'6" high, complete with tank, motor and equipment. Address: COLUMBIANA FOUNDRY COMPANY, COLUMBIANA, OHIO.

FOR SALE

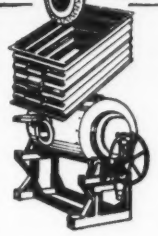
14 Osborn 275 PJ Jolt Squeezers, excellent condition, recently taken from service. $175.00 each. Address: Box 468, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FURNACES FOR SALE

Ten used heat treating furnaces and two 7-ton gantry cranes. Good condition, priced to sell. Address: BAER STEEL PRODUCTS, INC., BOX 1428, BOISE, IDAHO.

EUCLID FOUNDRY & MACHINE EQUIPMENT CO.

14919 SARANAC ROAD — CLEVELAND 10, OHIO



CORE OVENS:

1—Steiner Ives Co., gas fired, recirculating, Wheelco Controls, 88" wide x 48" deep, 7' high, 4 horizontal counterweight doors
1—Despatch, gas fired, recirculating, autocontrol
1—Coleman, Jr., gas fired, recirculating, drawer type

TUMBLING MILLS:

1—60" x 72" Ransohoff tumbling type wet cleaning mill, Serial No. 6318, drive 15 HP, bucket loader 5 HP 3/60/220
1—30" x 54" Royersford
1—36" x 54" Royersford

MAGNESIUM CLEANING CABINETS:

6—Whirlpool Duplex, 800 CFM, 100" wide x 65" deep x 90" high. Buffalo exhausters—7½ HP., 220/440

ASK FOR OUR COMPLETE LISTING!!

GUARANTEED USED FOUNDRY EQUIPMENT

GLENVILLE 1-1222

FOR SALE

MOLDING MACHINES
1—Tabor 22" Power Jolt, Rollover, Draw, Portable, 22" x 32" Table.
1—Milwaukee jolt-squeeze stationary.
2—International Jolt, Rollover Draw, 24" x 10G, Stationary.
2—No. 275 Osborn jolt squeezers, Stationary.
2—SPO Jolt Squeeze strip—13".

BLOWERS FOR CUPOLAS AND FURNACES
1—Connersville Rotary Blower, 6000 CFM.
1—Connersville Rotary Blower, 3500 CFM.
2—#7½ Roots Rotary Blowers—27 x 81—14000 CFM.
2—Connersville Rotary 14" x 27" HD, 2750 CFM at 5# press.
Maxon-Premix Blowers for Gas ⅛ to 1 HP.
2—2 HP 20 oz. Spencer Turbine Blowers.
1—Spencer Turbine Blower, 2700 CFM, 27 oz., 30 HP, 3/60/220-440 V.

METAL MELTING EQUIPMENT
1—1000# open flame brass melting furnace, gas fired.
1—Hausfeld tilting crucible, gas fired, 500# brass.
1—Hausfeld Stationary Brass, oil or gas burner, 200# cap.
1—Hausfeld Tilting crucible, gas 250# A1, Cap.
1—Hausfeld 2000# aluminum capacity furnace barrel type, open flame, oil fired.
1—#2 U.S. rotary melting furnace, 500# brass.

MISCELLANEOUS
2—Hydro-Blast barrels with 25 HP pumps.
3—Jib cranes, 16' swinging beam, 2000# cap.
1—International SB-11 core blower.
2—Pangborn cloth screen collectors, 1½ HP.
1—Stoney crane type shakeout.
1—Combs Riddle.
1—NDP Royer sand separator.
1—#16 Roto-clone unit complete.
1—Model S Screenarator.
Complete stock of rebuilt mill and dust exhaust blowers.

CLIFTON MACHINERY COMPANY
1023 W. SIXTH ST. CINCINNATI 3, OHIO

REPAIR AND REBUILDING SERVICE ON ALL PNEUMATIC TOOLS

We try to keep on hand a stock of **"Hard Chrome Rebuilt Foundry Tools"** such as Rammers, Chipping Hammers and Core Breakers.

Our prices are about **One-Half** the cost of new tools. All tools sold by us are guaranteed and can be returned if not found satisfactory.

CENTRAL PNEUMATIC SERVICE COMPANY
512 LINDEN AVENUE
DAYTON 3, OHIO

FOR SALE

Wheelabrator Tumblast, 36" x 42"	$1800.00
Osborn 275PJ	200.00
Tabor 10" Molding Machines	75.00
Gehnrich & Gehnrich preheating oven 600°F., 6' wide, 6' deep, 4' high with all controls, unused	650.00
Burring booth, Newcomb-Detroit, magnesium 15 HP motor, unused	750.00
Uniwash dust collector, 5600 CFM, Newcomb-Detroit, 10 HP motor and controls	700.00
American Rotocione 2500 CFM, sludge type, with 5 HP motor, blower and controls	400.00
#35 American Dustube with 3 HP motor, blower and automatic shaker	275.00
Pangborn CK 220 dust collector, 2000 CFM with 5 HP motor, blower, automatic shaker	500.00
Pangborn EN2 cabinet, suction type	250.00
Ruemelin 5' cabinet with table	210.00
35A American Dustube, unused, complete	235.00
Bench type Detroit Brinell	100.00
Tinius Olson tensile tester	250.00
Gogan 7500 KG motorized hardness tester	300.00
Demmler core blower, style No. 55	260.00
Climax wire cutter, ¼"-5/16"	190.00
3—SPO 110	185.00
Pangborn 2GF barrel	450.00
American Dustube #45, knocked down 2800 CFM cloth area, complete	900.00

M. ELSTEIN
426 GRAND STREET
JERSEY CITY 2, NEW JERSEY

FOR SALE

Immediate Delivery

1—Coleman double compartment rack type core oven each 10 ft. x 5 ft. x 6 ft. with double straight lift doors. Single recirculating heater.

Complete control equipment.

1—No. 2 unit drive Simpson mixer with motor and starter.

DETROIT FOUNDRY MACHINERY COMPANY
2008 PENOBSCOT BUILDING
DETROIT 26, MICHIGAN
PHONE: WOODWARD 3-8442

FOR SALE

JOHNSTON & JENNINGS 1020 B Jolt Rollover with hydraulic head, excellent condition

Ingersoll-Rand Air Hoists, one and two ton never used, still in original crates

Nichols Plain Molding Machine. High Speed
3 U.S. Variable speed Grinders, Double end, 7½ hp.
1 Standard Variable speed Grinder, Double end, 7½ hp.
1 Barrett cupola, 20" x 10' with air operated skip hoist
2 Whiting Hydro-Blast Barrels with pumps
1 Skip Hoist for 36 x 42 Tumblast Machine
1 Davenport no. 28 SA Jolt Rollover, Pattern Draw, 27 x 40 Table with Air Clamps
2 International Rollovers, Portable
1 International Core Blower SB 13
6 Arcade Model 100S Jolt Squeezers, Stationary
2 Champion Model JS 10-S Jolt Squeezers, Stationary
1 International Plain Jolt, 36 x 48
3 Milwaukee Squeezers, Stationary
2 International Squeezers, Portable
1 Whiting Tumbling Barrel 36 x 72 motorized
3 Snag Grinders A.C. & D.C.
Cupola Blowers, all sizes
3 Pouring Ladles, geared, 2000 lb. cap.
Aluminum core plates, 16 x 22, 16 x 20, 18 x 24

Steel Flasks 13 x 22 to 26 x 31

Wilson Hardness Testers
Steel corrugated, collapsible stacking boxes 35 x 50 x 25 deep
Magnesium and steel Buckets for elevators
Belting all sizes
Air Hammers, Grinders, Chippers

Many other Items in Stock
Send Us Your Inquiries

WE BUY—SELL—TRADE
HOMAN MACHINERY COMPANY
824 REEDY ST.
CINCINNATI, OHIO
MAIN 14634

FOR SALE

ALLIS-CHALMERS SAND CORE DRIER

Allis-Chalmers Model 100-A Foundromatic sand core drier consisting of 2 Model 100-25 KW dielectric generator units, and 2 conveyorized oven assemblies with single infeed and outfeed sections.

This equipment was used for experimental purposes and is practically new.

LINDE AIR PRODUCTS COMPANY
646 FRELINGHUYSEN AVENUE
NEWARK 5, NEW JERSEY
ATTN: J. M. HALBING

THE ACME *bargain page*

BLOWERS
Ingersoll-Rand Type FS. Single Stage 4000 CFM @ 3.75 PSI, 100 HP, 220V G. E. Induction motor.
General Electric 7500 CFM, 20 oz., 89.6 Max. HP, 220V motor, Airway controls.
Ingersoll-Rand turbo compressor 10500 CFM @ 20 oz. 85 HP G. E. 220V 3500 CFM motor.
1—Whiting-Allis Chalmers Turbo. 5750 CFM 28 oz. 60 HP 440V air pressure.

CONVEYORS, VIBRATING
36″ x 162′ Oscillating Pan Link Belt
30″ x 53′ Oscillating Pan Link Belt

CORE BLOWERS
3—International SB 12.
4—International SB 13.
10—Osborn 193.
1—Osborn 2035-2.
1—Champion CB 400.
2—CB 10 Late Type.
1—3E Demmler Drop Away Draw.
1—No. 4 Demmler.
1—Redford Bench Type.

CORE GRINDERS
3—Milwaukee 70-9.

CORE OVEN VERTICAL HORIZONTAL
1—Coleman, combination oil or gas fired 43 carriers 24″ x 90″—1 hour 12 min. to 4 hours 48 min. cycle.
1—Coleman, combination oil or gas fired 43—2 shelf carriers 30″ x 144″ long. 2 hour 12 min. to 7 hour 24 min. cycle. Present replacement cost over $90,000.

CORE PASTE OVENS
2—Coleman Gas Fired 28′-25″ x 42″ opening.

DUST COLLECTORS
Rotoclone 24W, 30 HP.

ELECTRIC MELTING FURNACES
Detroit Electric 1500#—Kuhlman 13200 volt transformer complete with controls.
Detroit Electric 350#—Kuhlman 13200 volt transformer and controls.
Detroit 350#-750# shells 2300V Primary, Complete with controls.

FURNACE TRANSFORMERS
We have Electric Furnace Transformers in stock from 800 KVA to 2500 KVA. Write us your needs.

FURNACES, ALUMINUM-BRASS
Stroman 1000# hydraulic Tilt-oil.
Stroman 300-400# hand tilt oil-gas.
Eclipse 100# RB stationary gas.
Stroman 350#.
Fisher 1000# BBI Manual Nose Pour.
Lindberg 500# ASM 600.

GRINDERS
Double End Disc:
1—U.S. 18″ wheels, 2 swing tables.

GRINDERS, SNAGGING
2—Hammond 10 WRI D. E. Snag. 20″ dia. wheels, 10 HP 220/440 v motors, variable speed drives.
1—3″ x 24″ U.S. #65, 20 HP 220/440V.

GRINDERS, SWING FRAME
1—3″ x 24″ x 12″ Marschke, 20 HP.
1—3″x24″x12″ U.S. 15 HP.

HOT METAL CARRIERS
3—1 ton D.C. Cab operated Cleveland, Monotractor Hot Metal Carriers.

LADLES
2000# Whiting Jr. & Car.
5000# Modern Geared.

MOLDING MACHINES
Jolt Squeezers:
5—Milwaukee 103-11 Staty. Jolt Squeezers, 13½″ x 20″ table.
7—Champion JS10P Portable Jolt Squeeze molding machine, 18″ x 21″ table.
1—Osborn 275J.
Jolt Squeeze Pin Lifts
2—Milwaukee Jolt Squeeze Strippers, Model 163-50, 15″ x 24″ table 16″ X open end pattern size.
1—#165 Milwaukee.
10—712 PJ Osborn, 18″ x 18″ table.

ROLLOVERS
1—Herman 4000# Series 30″ x 60″ table.
1—Herman 3000# Series 40″ x 84″ table, special slotted table.
1—Herman 1500# Series 20″ x 36″ table.
2—Herman 750# Series 20″ x 30″ table.
2—Herman 750# Series 20″ x 24″ table.
3—Spo Model 9032.
1—Milwaukee 217, 22″ x 42″ table.
2—International Type G, Portable, 20″ x 8″ draw.
3—Tabor Portable Rollover 30″.
Johnston & Jennings 1020-44 x 44 max. Flask Size.
Osborn #405 20″ x 60″ table.

PIN LIFT PUSHOFFS
1—Champion Pin Pushoffs 28″ x 42″ table 10″ draw.
Milwaukee 620 ND-20″ x 24″ table.

MULLERS
Simpson 1 H
Simpson #2 Unit drive
#70 B & P modern cross head, rebuilt.

OVENS, CORE
Despatch Type S, 2 cars 27½ x 54 x 64, Gas Fired.
Despatch recirculating gas 60″ x 54″ x 64″.
2—Thermonic 900A-1800A.

OVERHEAD TROLLEY CONVEYORS
5000′ Jervis B. Webb & Link Belt 658 chain, 4 D.C. motor drive and MG set.

POURING DEVICES
3—Pouring devices, Whiting 500#.

SAND CONVEYORS
144′-30″ Flat with Drives.
47′-30″ Trough with Drives.

SHAKEOUTS
Link Belt 5′ x 10′—7½ HP motor
3 x 5 Simplicity.

TUMBLING BARRELS
3—Royersford 42′ x 72′ Roller Bearing, Chain Drive.
1—Sly Square 42 x 42 x 64.
1—Sly 42″ Dia. x 56″.

WIRE STRAIGHTENERS
Climax 2A
Lewis 7C 1/16″ to 3/16″ with cutoff.

WHEELABRATORS
1—27″ x 36″ Rubber Belt Wheelabrator
48″ x 42″ American, bucket loader

ACME

ACME EQUIPMENT CO., INC.

We will buy for cash a single piece of equipment or your entire plant

126 South Clinton Street • Phone: ANdover 3-3430 • Chicago 6, Illinois

MDNA

UNIVERSAL REBUILT EQUIPMENT GUARANTEED

AIR COMPRESSORS

COMPLETE STOCK—BURY, PENNSYLVANIA, SULLIVAN, INGERSOLL-RAND —SEND YOUR REQUIREMENTS

BLOWERS

25—CENTRIFUGAL, 16 oz., 2 to 5 HP
10—GE, WILBRAHAM-GREEN, FISHER Positive Pressure and Cent. Cupola Blowers

CLEANING EQUIPMENT

1—AMERICAN WHEELABRATOR TUMBLAST 1945, 48" x 72", with Skip Loader, Vert. bucket conveyor, motors & controls

1—AMERICAN WHEELABRATOR TUMBLAST, 48" x 48" w/loader used 9 Mos.
1—AMERICAN WHEELABRATOR TUMBLAST, 42" x 48" w/loader
1—AMERICAN WHEELABRATOR TUMBLAST 36" x 42" w/loader
1—AMERICAN WHEELABRATOR TUMBLAST, 27" x 36" w/loader
1—AMERICAN WHEELABRATOR, 36", Continuous Side Discharge, Two Head, Serial #A95643, New 1953, Used 2 Months
1—PANGBORN TABLAST, 8' Table
1—PANGBORN ROTOBLAST, #28, Type GK
1—PANGBORN BLAST CABINET, #EP-5
3—TANNEWITZ METAL CUTTING BANDSAWS, 30" and 36"
1—CRESCENT METAL CUTTING BANDSAW, 30"
4—BURRING BENCHES, Magnesium cleaning, 9' L x 30" H x 30" W

CONVEYORS

1—LINK BELT, vibrating, double deck, 80' x 24", w/exhaust hood
1—LINK BELT, Car type mold, 114 cars, 403' track, car size 18" x 42"
1—JEFFREY, 3 compartment, ingot mold
4—SAND ELEVATORS, Various sizes
6—SAND BELTS, 10' ctrs. to 140' ctrs.
2500 FEET—FOUNDRY TYPE ROLLER CONVEYOR—ALL SIZES
2—LINK BELT, 30" Steel Apron Conveyors, 100' Centers

CORE BLOWERS

2—DEMMLER #2, vert. or horiz.
1—DEMMLER #2A
1—DEMMLER #3K
1—DEMMLER #55, Late Model
1—DEMMLER #2K
1—OSBORN #92
2—OSBORN #192, #193
1—CHAMPION CB-12
1—CHAMPION, Model CB-400
1—INTERNATIONAL SB-13
1—OSBORN Core Rollover, #136-3, (NEVER USED)

CUPOLAS

1—MORRIS #9, Skip charger, Blower, Mixing Ladle, Never Installed
1—SKIP CHARGER for #9 Cupola with scale and buckets

DUST COLLECTORS

4—ROTOCLONE, #12, Type N, wet type
1—ROTOCLONE #14D w/Filter
1—ROTOCLONE, 16W
2—ROTOCLONE, Size 20D, Hopper type F
1—ROTOCLONE, Type W, 30" w/precleaner

FLASKS

150 HINES AND FREEMAN ALUMINUM, Popoffs and Jackets
200 TRANSITE CORE PLATES, Various Sizes
SEND US YOUR REQUIREMENTS

FURNACES—DIRECT ARC MELTING

1—3,000#/hr. LECTROMELT
1—250 Lb. LECTROMELT, Side Charge
1—500 Lb. LECTROMELT, Side Charge
1—3 Ton LECTROMELT

FURNACES—INDIRECT ARC

1—350#/hr. DETROIT, Complete
1—1500# DETROIT ROCKER, Complete
1—3000# DETROIT ROCKER, Complete

FURNACES—INDUCTION MELTING

1—30 KW, LEPEL
1—20 KW, AJAX SPARK GAP, High Frequency
1—3 KW, AJAX, Lab type
1—75KW Induction Melting Furnace complete with 200 lb. Furnace.
1—30 KW Induction Melting Furnace with 100 lb. Furnace.

MUST SELL AT ONCE

PANGBORN CONTINUOUS SHOT BLAST MACHINE

REPLACEMENT COST OVER $75,000.

5 Wheel Type each wheel driven by 20 Hp AC Motor. Pendulum type #458 chain conveyor for pick up and return, w/motor driven screw type conveyor for shot return to bucket elevator. Complete w/all controls and switches. Serial #180 RF-3918. Large lot of new spare parts.

PRICED FOR QUICK SALE

FURNACES—GAS & OIL

1—FISHER MNP, Gas, Tilting, 1700# cap. Mag.
2—FISHER, Gas, Stationary, 4 Burner, 500# cap.
1—FISHER MNP, Oil, Tilting, with blower, 500# cap. Alum.
1—FISHER MNP, Oil, with blower, 1500# cap. Brass
3—FISHER, Oil, Stationary, model 125, type S, Brass
1—DEMPSEY, Reverberatory, 10,000#, 9' W x 14' L x 9' H, Oil
1—HAUSFELD, Tilting, 1200# capacity
1—SKLENAR, Oil, 600# Cap.
1—STROMAN, Gas, Tilting, 1,000# cap. Alum, auto control hyd. lift
1—REDA 550#. Never Used

MOLDING MACHINES

Jolt Rollovers

2—J & J #918
1—J & J #815, 30" x 40", 15" draw, 1200# jolt
2—INTERNATIONAL, 13 x 17" table, 6" draw
1—HERMAN 10,000#, 48" x 109" table
1—HERMAN 6000#, 42 x 78"
1—HERMAN 3000#, 30" x 66" Table
2—HERMAN 1500#
1—HERMAN 750#, 30" x 36"
1—OSBORN, 712 PJ, 18 x 28"
1—OSBORN #602, 36" x 26"
2—OSBORN #405-86, with leveling carriage
1—OSBORN # 405, 3,000#, flask size 64" x 50", 18" draw
4—OSBORN #142, 15" x 20", hand draw
4—TABOR, 40 x 60", 2000 & 3000# capacity
1—TABOR, 30" x 40" with air clamps
3—TABOR 22" x 42", pattern draw, shockless, portable
1—TABOR, 20 x 30" w/air clamps, 1000#
2—TABOR, 14" x 16" Rockover
1—SPO ROCKOVER #506

Bumpers

1—OSBORN #102
2—DAVENPORT, 30" x 30" table
1—DAVENPORT, 24" x 27" table

Jolt Strippers

1—J & J, 30" x 24" table, 600# cap.
2—SPO #305, 20" x 27" table, 750# cap.
1—HERMAN, 22" x 30" table, #4317
1—TABOR, 20" x 20" table, hand strip
1—MILWAUKEE #1536, 32" x 38"
1—INTERNATIONAL 1255 PKL
1—OSBORN #550
2—SPO, #2160
1—TABOR, 17" x 20" table, portable

Jolt Squeeze Strippers

1—OSBORN #175, 21" x 18", portable
2—MILWAUKEE #163
2—OSBORN #714
2—OSBORN #712

Jolt Squeezers

2—MILWAUKEE #105JS, 17 x 21", portable
4—SPO #110J, Portable
6—OSBORN #275-J, Portable
6—OSBORN #275PJ, Stationary
2—INTERNATIONAL, #12 LJS
6—TABOR, 3" Jolt, 17 x 20"
4—INTERNATIONAL, #10 LJS
1—MILWAUKEE, #126, 21" x 27" portable
2—NICHOLS, #12 F-P, portable

MATERIAL HANDLING

1—HYSTER, Fork Lift, Gas, 7500 lb. capacity
1—BYERS, Mobile Crane, BUDA Engine, 50' Boom
1—MAGNET, 36" Lifting

MULLERS AND MIXERS

1—SIMPSON #0, 3' Dia., 1½ to 1¾ cu. ft.
1—CLEARFIELD, #920, 9' Dia., 25-30 cu. ft.
4—BAKER PERKINS, #4A
3—SIMPSON, #0, Stainless Steel Lined, 3' Dia.
1—SIMPSON, #1, 4' Dia.
1—SIMPSON, #3, 8' Dia., Open Gear, with loader
1—B & P, #40 SPEEDMULLER, with loader
1—B & P, Conventional, SIMPSON type, 87½" Dia., arranged for cooling

LADLES AND POURING DEVICES

MODERN, SWINDELL, WHITING, TREADWELL—All Types and Sizes—Ready for your Needs!

OVENS

1—COLEMAN, OIL, one compartment, recirc., 60" W x 80" H x 14' 6" L
2—ROSS, Gas, 2 compartment, recirc., rack type, 6½" x 14' x 7'
1—YOUNG BROS. elec., 3 compartment, Kiln type
3—GENRICH, elec., 3 drawer, preheating, auto-control, 9' H x 8' W x 6'7" L
1—COLEMAN, Gas, 2 Comp. and 5 drawers, 22' x 12' x 10'

SAND CONDITIONING

3—B & P SCREENERATORS Model L, M and S
1—ROYER PREPARATOR, Comb. Model RC, 40 Ton/hr. Scrap removal, 9' x 9' hopper
3—ROYER, NB-2, 12" Belt
1—JEFFREY SANDITIONER, PORTABLE

UNIVERSAL MACHINERY AND EQUIPMENT CO.

1630 N. Ninth St., Reading, Pa. **Phone 3-5103**

AAA MACHINERY & EQUIPMENT CO.

over 1000 satisfied customers

WORLD'S LARGEST INVENTORY OF GUARANTEED FOUNDRY EQUIPMENT

AIR COMPRESSORS

1—CHICAGO PNEU., 160 CFM, 30 HP.
1—SULLIVAN WG-8, 152 CFM, 20 HP.
1—CHICAGO PNEU., Size 7½ x 6, 20 HP.
2—GARDNER, Model ADR, 15 HP.
1—SULLIVAN WN-3, 1220 CFM, 250 HP.
1—GARDNER RXC, 177 CFM, 40 HP.

AIR & ELECTRIC HOISTS

85—INGERSOLL RAND Air Hoists, Sizes A, B, C, D, & D6. ¼, ½, 1, 2, & 3 tons cap.
15—DETROIT Air Hoists, 1 & 1½ ton cap.
15—APPLETON Air Hose Reels.
2—P&H and DETROIT Model LHR, 5 ton Electrics.

BUCKET ELEVATORS

2—LINK BELT 35 ft. & 50 ft., 12" x 7" Buckets.
2—NATIONAL 45' & 50', 10" x 7" & 16" x 8" Buckets.

CUT-OFF MACHINES

1—DeWALT ME2, 10 HP, 24" Blade.
1—GROB Band Saw, Type OS-36.
3—TESSEMER H & I Sprue Cutters.

CORE BLOWERS

3—CHAMPION Model CB-10, CB-18, & CB-400. From 10 to 300 lb. Cores.
22—DEMMLERS Model Nos. 1, 1E, 2, 2E, 2K, 3, 3E, 3K, 4, & 4E. From 10 to 100 lb. Cores.
7—INTERNATIONAL Model SB-11 & SB-13, SB-15H, 15 to 30 lb. Cores.
6—OSBORN Nos. 91, 192, & 193. From 10 lb. to 75 lb. Cores.
8—REDFORD & MILWAUKEE Bench Type.

CORE OVENS

4—CARL MAYER 2-Compartment, gas fired, I.D. 7' W x 14' deep x 8' H each.
1—INDUSTRIAL "Revolving Carriers" continuous, 18" x 80" trays.

CORE OVENS (Con'd)

1—MAEHLER Single Compartment I.D. 96" L x 80" W x 84" H, gas fired.
2—PORBECK Model C-3-C, Double Drawer Type.

CUPOLA BLOWERS & EQUIP.

1—SPENCER 150 HP 7500 CFM 48 oz.
2—INGERSOLL RAND FS-367, 8,150 & 9,400 CFM, 50 & 100 HP motors.
1—ROOTS 7,000 CFM, 50 HP motor.
14—LINDBERGS. From 1 HP to 15 HP. 160 to 2100 CFM.

ROTO-CLONES WET TYPE

9—AMERICAN AIR FILTER Type N&W. Sizes No. 10, 14, 20, 24, 27, & No. 30. All arranged with sludge ejectors. Capacities up to 30,000 CFM.

ELECTRIC MELTING FURNACES

4—DETROIT Rockers Type AA, 750 to 1500 lbs. capacity with 200 or 350 KVA Transformers.
1—AJAX 20 KW Induction Unit.
1—TOCCO 20 KW Induction Unit.
3—AJAX No. 300 & 500 Furnaces Only.

GAS & OIL FIRED FURNACES

23—LINDBERG FISHER Model MN P Electric Tilting, Sizes 150, 300, 400, 600, 1700, 2000, & 2400. Aluminum capacities 150 to 2400 lbs. Gas or Oil Fired, With Motors & Blowers.
5—LINDBERG FISHER Type BBI Hand Tilting Furnaces, Sizes 100, 125, 225, & 1000, With Gas or Oil Fired, With Motors & Blowers.
29—LINDBERG FISHER & CAMPBELL HAUSFELD Stationary, Sizes 100, 150, 200, & 550, from 100 to 550 lbs. capacity. Gas or Oil Fired, with motor & blowers.

GRINDERS

Swing Frame

1—MARSCHKE 12" x 2" wheel, 3 HP.
1—MARSCHKE 20" x 10" wheel, 10 HP.
2—FOX No. 6, 24" x 10", 15 HP.
3—MARSCHKE 24" x 3" wheel, 15 HP.

Snagging

2—U.S. #64, 20" x 3" wheel 7½ HP.
2—SAFETY #174, 24" x 3" wheel 10 HP.
2—MARSCHKE 24" x 4" wheel, 20 HP.

Disc

1—BEASLEY #372 Vertical Spindle Dry Grinder, 53" dia., 20 HP, new 1952.
1—QUEEN CITY Model 100 20" x 2" wheel.
1—U.S. #80, 16" x 3" wheel, 7½ HP.

Core

2—MILWAUKEE 70-12, 70" dia. table.
1—STONEY Core Grinder, 16" dia. Wheel.

LADLES

17—MODERN & WHITING Cylindrical Ladles, 275, 1500, 2450, & 3000 lbs. capacity. All Enclosed Gears, Some Mounted on Stands.
12—MODERN Model F-9 and FA-9 Pouring Devices, with ladles 400 to 800 lbs capacity.
37—MODERN & WHITING Lip Pour, Enclosed Gear, 1200, 1600, 2000, 4000, 6000, 7000, 8000, 20,000, 40,000, & 80,000 lbs. capacity ratings.
7—MODERN & WHITING Cylindrical Mixing Ladles, 2 & 3 ton capacities. Electric & Manual Tilting.
7—WHITING Bottom Pour 4 ton.

MOLDING MACHINES

Jolt Squeezers

37—OSBORN, SPO, MILWAUKEE & TABOR, Portable & Stationary. 10" Squeeze Cylinder.
13—OSBORN, MILWAUKEE & SPO Portable & Stationary, 12" Cylinder.
6—MILWAUKEE 18" Cylinder, 24" x 36" Table.

Jolt Rollover Pattern Draw

1—DAVENPORT 28-SA, 29" x 40" table.
2—DAVENPORT 40-SA, 42" x 50" table.
1—HERMAN 6000 lb. Series, 42" x 78".
3—HERMAN 1500 lb. Series, 26" x 48".
1—HERMAN 750 lb. Series, 20" x 30".
2—HERMAN 4000 lb. Series, 40" x 60".
14—INTERNATIONAL Type G, Table Sizes 20" x 8", 24" x 10", 30" x 12".
1—INTERNATIONAL RES Size 15" x 8".
2—J & J #612, 24" x 30" Table.
4—J & J #918, 44" x 54" Table.
1—J & J #815-B, 30" x 40" Table.
1—MILWAUKEE #167, 32" x 33" Table.
1—MILWAUKEE #217, 35" x 41" Table.
1—MILWAUKEE #60B-3, 60" Flask.
10—OSBORN #40 and 42 Core Rollovers.
1—OSBORN #442, 21" x 31" Table.
2—OSBORN #242W, 29" x 42" Table.
12—OSBORN #601 & 602, 30" & 36" Wide Flask, 10" Draw, 750 lbs. Cap.
1—SPO #413D, 24" x 25" Table, 10" Draw.
1—SPO #506, Portable, 24" x 30" Table.
3—TABOR 30" x 40" Table, 12" Draw.
4—TABOR 22" x 32" Table, 10" Draw.

Jolt Pin Lift

2—DAVENPORT 24-AJS, 24" x 30" Table.
2—OSBORN #559, 25" x 30" Table.
1—OSBORN #560, 32" x 45" Table.
1—OSBORN #563, 55" x 63" Table.
2—MILWAUKEE #2542, 38" x 42" Table.
1—SPO #3058, 22" x 28" Table.
1—INT. JDP 1600 x 10.

Pin Lift

9—INTERNATIONAL & B & P Speed Draw Machines. Used with Sand Slinger. Capacity from 600 to 2000 lbs., up to 30" x 40" flasks.

Jolt Squeeze Pin Lift

1—MILWAUKEE #216, 21" Squeeze Cyl.
1—MILWAUKEE #125, 21" x 27" Table.
1—OSBORN #716-PJ, 22" x 34" Table.
1—OSBORN #712-V, 18" x 26" Table.
2—OSBORN #710-J, 17" x 21" Table.
4—INTERNATIONAL PKL, 17" x 26" Table.
1—SPO #2114, 20" x 27" Table.
2—SPO #2136-G, 19" x 26" Table.

MATERIAL HANDLING EQUIPMENT

1—HAYWARD 1 cu. yd. Electric Clamshell Bucket.
1—EC&M 45" dia. Type SA, Magnet.
3—HOUGH Model HA Payloader, hydraulic.
1—BLAW-KNOX ½ yd. Bucket.

CONVEYORS

Steel Apron

9—JEFFREY & LINK BELT 24", 30", 36", 42", & 48" Widths. Length built to your specifications, with reducers & motors to your speed requirements.

Oscillating

3—SIMPLICITY Model OA-10-A, 36" x 15'.
1—LINK BELT 48" x 154', 20 HP Motor.
2—LINK BELT 24" x 50'.

Roller

2500' MATHEWS 6", 14", 22", 24", & 30" wide. Heavy duty. 2 7/8" dia. roller, 1 1/8" hex shaft on 3" & 4" centers. Mounted above rail on 4" channel iron. Send us your requirements.

Mold

1—LINK BELT 36 cars 4' x 5', 190' track, with automatic dump. New 1952.
3—LINK BELT 88 Cars 20" x 48", 350' track, with automatic dumping.

Belt

LINK BELT & JEFFREY 18", 24", & 30" wide. Flat or trough idlers, all Timken bearings. Built to your specifications. Can be equipped with molders hoppers & ploughs.

MOLDERS HOPPERS & STORAGE BINS

7—NATIONAL & LINK BELT Storage Bins, 60 to 150 tons cap.
42—MOLDERS Hoppers 1½ ton cap. Air gates.
2—NEWAYGO Handy Sandy HS-7-GT.

SAND MULLERS

1—B & P #7 Mulbaro, 700 lb. cap.
1—B & P #30 Speedmullor.
1—B & P #70 Air Cooled.
1—BAKER PERKINS #16½, 30 HP.
1—CLEARFIELD No. 414, 4 cu. ft.
1—CLEARFIELD No. 610, 1000#'s.
1—DRAVO-DOYLE 6 cu. ft. cap. Port.
1—LINK BELT 48" x 8' Paddle Type.
2—SIMPSON #1 Style B, 400 lb.
3—SIMPSON #3 Style C, 3000 lb.
1—SIMPSON #2 Style C, 1500 lb.
3—SIMPSON #3 Style UD, 3000 lb.
1—SIMPSON #0 Style B, 175 lb.
1—SIMPSON #1½ Style C, 700 lb.

SAND PREPARATORS

2—NATIONAL #3 Style C Aerators.
6—ROYER Complete conditioning units including Shakeout, Belt Conveyor and Sand Blender.
6—B & P Screenerators, Models S, M & L.
1—PEKAY Aerator, Model 320-3.
8—ROYER, Models, NDP, C-2, NC-4, NDS.
6—AMERICAN Sand Cutters, Model M, Sizes 79/60, 89/70, 99/80. All late models.
4—AMERICAN Model AA and AM, 45" & 60" Cutting Blade.

SANDSLINGERS

2—B & P Tractor Type 19" head & 16" head, 13' arms. Magnetic towers.
6—B & P Model DB Stationary Sand Slinger, 16", 19" and 22" heads, with 20, 25, 40 and 50 HP motors. All late models.
2—B & P Swing Type Slingers 19" head.
1—B & P 2 ton plate feeder.
4—B & P 8 ton plate feeders.

SHAKEOUTS & SCREENS

1—SIMPLICITY 3' x 5' Model B, 5000#.
1—SIMPLICITY 3' x 8' Model BG, 5000#.
1—ROBBINS 8' x 10' Model JF-11 Dual, 16 tons per unit.
1—SIMPLICITY 4' x 10', Model D.
1—SIMPLICITY 6' x 8', Model DE.
1—SIMPLICITY 5' x 8', Model D.
1—NATIONAL ENG. 5' x 8' Hex Screen.
1—HEWITT-ROBINS 36" x 78" Vibrex.
1—SIMPLICITY 4' x 10' Model B, single deck sifter screen, 10 HP motors.

SAND BLAST EQUIPMENT

1—AMERICAN #3 Tablast, 4—48" tables.
1—AMERICAN #1 Tablast, 7—14" tables.
1—AMERICAN 27" x 36", w/Skip Hoist.
2—AMERICAN 36" x 42", w/Skip Hoist.
2—AMERICAN 48" x 42", w/Skip Hoist.
1—PANGBORN 9LF-14—9' dia. Plain Table w/two Roto-Blast units and CH-2 Dust Collector, 4850 CFM. New 1951.

TUMBLING BARRELS

13—SLY & WHITING. All late type units, with gearhead motors and built in magnetic brake, Timken bearings. Following sizes 30" x 60", 36" x 54", 36" x 84", 42" x 72", 48" x 72", 48" x 96", 72" x 120". Send for detailed specifications.

AAA MACHINERY & EQUIPMENT CO.

15539 SARANAC ROAD—CLEVELAND 10, OHIO—CALL LI. 1-6545

ACME IS NOW LIQUIDATING

SPENCER FOUNDRY DIVISION

PARK and FIRST STREETS

WILLIAMSPORT, PENNSYLVANIA

Phones 9161-9162 Williamsport

ONE OF THE EAST'S LARGER PRODUCTION FOUNDRIES.

OVER 200,000 SQUARE FEET FILLED WITH GOOD FOUNDRY EQUIPMENT

Everything must be sold! The building must be prepared for other uses as quickly as possible!

The following is a partial list of the thousands of items offered for sale—Send for our more complete list or better yet come over and see for yourself!

1—Whiting #10 Cupola; 2—Whiting #9 Cupolas; 2—14000 C.F.M. 40 oz. Cupola Blowers; 3—Simpson #3 Mullers; 1—B. & P. #70 Muller; 1—B. & P. #60 Muller; 3—Mold Conveyors, 1 with 48″ x 84″ cars; 3—Synchronous Air Compressors up to 300 H. P.; 30—Molders hopper system; 28—Molding Machines, Nichols, Milwaukee, Osborn, Davenport; 1—B. & P. 27/40 H.P. Slinger; 1—B. & P. 19″ Tractor Type Slinger; 2—Slinger Turntables 24′; 4—Shakeouts; 20—Air Hoists; 5—Core Grinders; 2—Fox Single Wheel Grinders; 10—Core Blowers; 4—Wheelabrators; 3—Tumbling Barrels; Laboratory Equipment; Complete Pattern Shop.

Ladles, 200 ton flasks, air tools, yard switching engine, monorails, trolleys, bridge cranes, core plates, chaplets, foundry supplies and alloys, thousands of feet of flat and troughing sand belt conveyors, thousands of feet roller conveyors, and other items too numerous to mention.

Please write for our illustrated circular.

WRITE • WIRE • PHONE

ACME EQUIPMENT COMPANY, INC.

DIRECT ALL INQUIRIES TO LIQUIDATION OFFICE

Park & First Streets, Williamsport, Pennsylvania; Phone: 9161-9162 Williamsport

Main Office: 126 S. Clinton Street, Chicago 6, Illinois; Phone: ANdover 3-3430

Circle 870 on Inquiry Card—Page 209

CLASSIFIED ADVERTISING RATES

(Effective July 1, 1956)

POSITION WANTED—Minimum advertisement set solid, 30 words or less, $3.50. Additional words 15c each.

ALL OTHERS—"Help Wanted"—"For Sale"—"Wanted-To-Buy", etc., minimum advertisement set solid, 30 words or less, $8.00. Additional words 30c each.

NOTE—If replies are to be sent to a box number in care of FOUNDRY, add 8 words to your advertisement for box number and address.

Any advertisement set in all capital letters, add 50% to the above rates.

FOUNDRY

PENTON BUILDING • CLEVELAND 13, OHIO

INCH RATES PER INSERTION

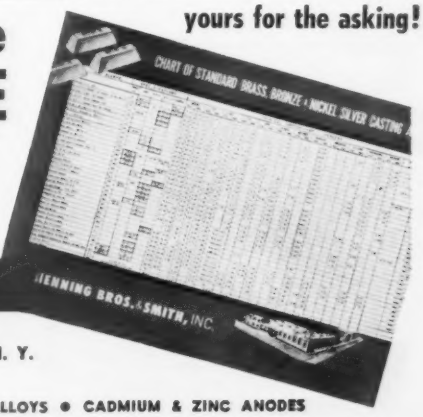
Single Column 2¼" Wide	One Time	Three Times	Six Times	Nine Times	Twelve Times
1 inch	$ 22.20	$ 21.00	$ 19.80	$ 19.20	$ 18.60
2 inches	43.20	40.80	38.40	37.20	36.00
3 inches	63.00	59.40	55.80	54.00	52.20
4 inches	81.60	76.80	72.00	69.60	67.20
5 inches	99.00	93.00	87.00	84.00	81.00
6 inches	115.20	108.00	100.80	97.20	93.60
7 inches	130.20	121.80	113.40	109.20	105.00
8 inches	144.00	134.40	124.80	120.00	115.20
9 inches	156.60	145.80	135.00	129.60	124.20
10 inches (1 col.)	168.00	156.00	144.00	138.00	132.00
15 inches (½ page)	243.00	225.00	207.00	198.00	189.00
20 inches (2 cols.)	312.00	288.00	264.00	252.00	240.00
30 inches (full page) ..	450.00	414.00	378.00	360.00	342.00

Remittance should accompany advertisement when submitted. Terms: 2%, 10 days. Forms Close 13th of Month Preceding Issue.

send for this valuable quick-reference 17" x 22" standard alloy wall chart FREE

yours for the asking!

This see-at-a-glance wall chart will save you hours of time in making up your specs. Chart shows all types of customer specifications: Navy, S.A.E., A.S.T.M., and Federal. It shows chemical composition, by percentages, of 37 alloys. Write today for your copy to:



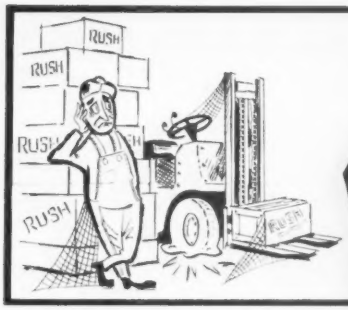
HENNING BROS. & SMITH, INC.

"Dependable Service Since 1922"

91-125 Scott Ave. at Randolph St., Brooklyn, N. Y.

HYacinth 7-3470-1-2-3

ZINC BASE ALLOYS • BRASS, BRONZE & ALUMINUM INGOTS • LEAD & TIN BASE ALLOYS • CADMIUM & ZINC ANODES



HOW MUCH IS DOWN TIME Costing You?

SWITCH TO

MITCO INDUSTRIALS!

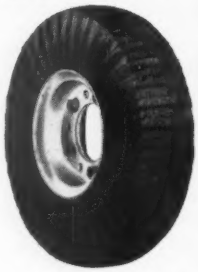
NO FLATS, NO PUNCTURES
NO BLOWOUTS

The premium quality laminated tire. NOW offered as standard or optional equipment by 36 original equipment manufacturers!

Resilient, easy steering Mitco Industrial Tires. **Rugged Performance.** Thrive on hazardous operations and have unequaled carrying capacity.

Extra Traction with gripping tread. **Longer Life**—often 4 times as long.

For Pay Loaders, Fork Trucks, Tractors, Yard Cranes and other Industrial and Agricultural Equipment.



Savings on Tire Expense Guaranteed

Write or wire for name of nearest distributor.

MITCO INDUSTRIAL TIRES

MITCHELL INDUSTRIAL TIRE CO., INC.
Chattanooga, Tennessee
P. O. Box 468 Phone TAylor 1-7531

Circle 751 on Inquiry Card—Page 209

Zircon Sand
Zircon Flour
Silica

BERKSHIRE BCI CHEMICALS

ISCO

BERKSHIRE

Potassium
Titanium
Fluoride

Potassium
Zirconium
Fluoride

BERKSHIRE CHEMICALS, INC.
420 LEXINGTON AVENUE • NEW YORK 17
55 New Montgomery St. • San Francisco 5, Cal.
Innis Speiden Company Division
New York • Philadelphia • Boston • Cleveland • Chicago

Circle 753 on Inquiry Card—Page 209

---

for **HEAT TREATING—BAKING —ANNEALING FIXTURES**

Call Wiretex **BASKETS**
MUFFLES • SCREENS • GRIDS
RACKS • ETC.
Every Weave, Alloy, Size, Load, Process and Quantity.
STANDARDS or CUSTOM MADE TO YOUR SPECIFICATIONS.

Wiretex mfg. co.

SEND FOR CATALOG 26 Mason St., Bridgeport 5, Conn.

Circle 752 on Inquiry Card—Page 209

HIGH SILICA QUARTZITE PEBBLES

★ ★ ★

R. W. SIDLEY, INC.

THOMPSON, OHIO TEL. 2701

Circle 754 on Inquiry Card—Page 209

GLOSSARY OF FOUNDRY TERMS

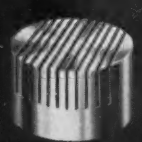
Compiled by Ed Bremer, FOUNDRY Metallurgical Editor

This extensive glossary of foundry terms was compiled from a wide variety of sources. Arranged in handy booklet form, it is a valuable reference for every foundryman. 48 pages.

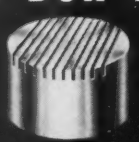
$1.00

PENTON PUBLISHING COMPANY, Book Department
1213 West Third St., Cleveland 13, Ohio

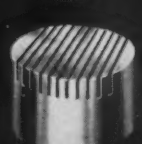
SLOTTED CORE BOX VENTS



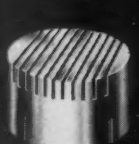
X-TRA DEEP HEAD .156 Wide Slots .014



SHALLOW HEAD .031 Wide or Narrow Slots .014 .010



DEEP HEAD .093 Wide or Narrow Slots .014 .010

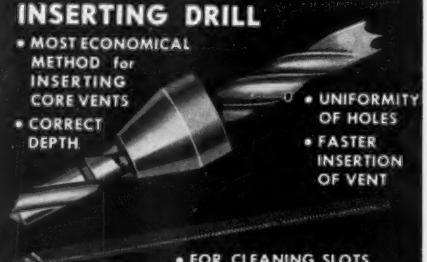


CO_2 TYPE DEEP HEAD .093 Wide or Narrow .014 Slots .010

Manufactured by **C.M. SMILLIE & CO.** 1124 WOODWARD HGTS., FERNDALE 20, MICH

INSERTING DRILL

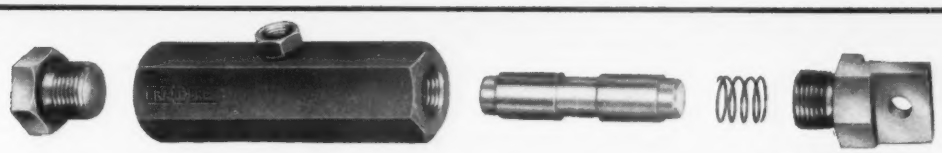
- MOST ECONOMICAL METHOD for INSERTING CORE VENTS
- CORRECT DEPTH
- UNIFORMITY OF HOLES
- FASTER INSERTION OF VENT



VENT CLEANER

- FOR CLEANING SLOTS
- MADE OF TEMPERED STEEL
- EASY TO USE

Circle 755 on Inquiry Card—Page 209



3 steel alloys*

Give Branford vibrators longer life

Strength and durability are built in . . . preserved . . . through specific steel alloys that give each part of each Branford Vibrator the properties it needs for a long serviceable life.

Branford Pistons are built from hard, chrome-coated steel, especially wear resistant to maintain efficient precision over long periods of use.

Springs made from high tensile, flexible steel flex themselves millions of times without fracture . . . without fatigue.

Branford body steel is rugged, tough, ready to take the torture and stress of vibration without breaks, cracks, and without frictional wear.

When you specify "Branford Vibrators" you receive unmatched performance, longer service, less down time.

Write for your Branford catalog and the name of your local Branford distributor.

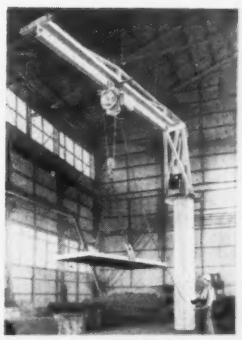
*** Branford Vibrators are built in every size—and in every size they are built from steel throughout (including the bodies).**

THE BRANFORD COMPANY 130 CHESTNUT STREET — NEW HAVEN, CONNECTICUT

Circle 756 on Inquiry Card—Page 209

NOW! Electric Power for Moving **BIG LIFTS**

UP-DOWN-and AROUND



Get Full Circle Precision Control with **LeTOURNEAU** Electric Hoists and **POWER-ROTATED JIB CRANES**

Here is three dimensional, fraction-of-an-inch control of 6 to 15-ton loads. Smooth starts and stops under full load with rotation either way at one-half rpm or less . . . and capacity load suspended anywhere on the 25' boom! All-welded steel construction.

Optionally equipped with the LeTourneau Electric Hoist matched to *your* job requirements. Dual braking system: Positive, mechanical brakes stop and hold capacity loads; regenerative electric braking automatically controls lowering speed. Each safely controls 1½ times rated load.

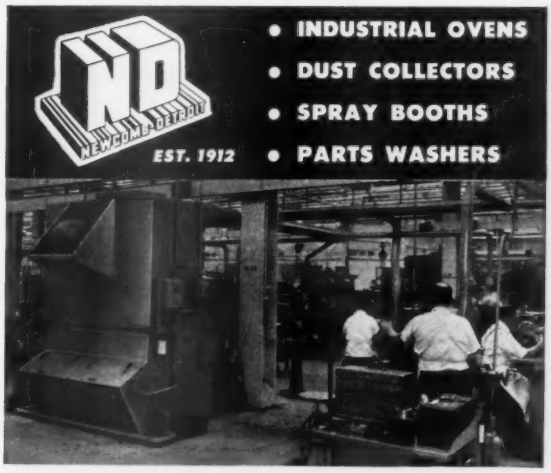
LeTourneau AC motors power hoist, rotate boom, and operate trolley. These motors sustain temporary low voltages without damage. They are instant reversing, varying speed type, either single speed or two-speed control.

Write today for literature

R.G. LeTOURNEAU INC

2892 South MacArthur, Longview, Texas - Industrial Equipment Division F-118

Circle 757 on Inquiry Card—Page 209



UNI-WASH DUST COLLECTORS

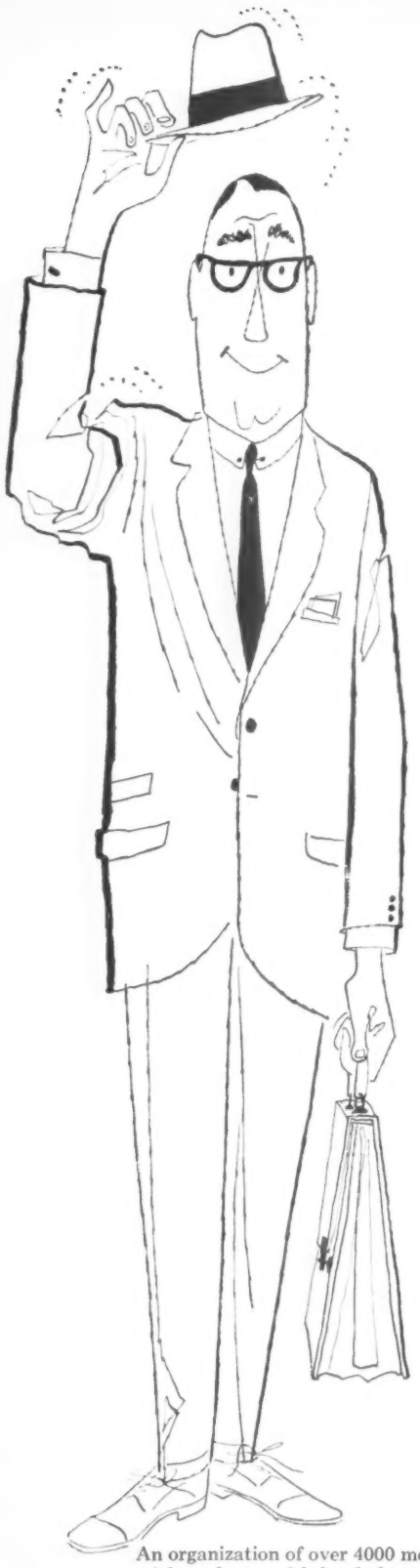
Compact, complete recirculating Water-Type Dust Collectors for industrial processing dusts. Dirt is collected as wet sludge which may be carried away automatically. No moving parts. Extremely efficient for grinding operations. Eliminates danger of explosion from magnesium and aluminum dust. Proven in foundries. Standard Units available.

For Bulletins and Quotations, write to:

NEWCOMB-DETROIT

5755 RUSSELL ST. • DETROIT 11, MICH.

Circle 758 on Inquiry Card—Page 209



$21 for a sales call —but how many dollars worth of SELL?

Recent surveys show that the average cost of a sales call is approximately $21. Costs in your company may be somewhat more or somewhat less—but the important question is "How much SELL are you getting for your sales call dollar?"

You are not getting full value unless you are giving industrial advertising a chance to do its proper share of the sales job—making continual contacts, arousing interest, creating preference for your company and its products.

If advertising is doing this part of the job, your salesmen can concentrate on the "climax steps" of selling—showing the prospect what your products will do for him, and getting his order.

The salesman always "carries the ball," but he gains more ground when a well-balanced advertising program "runs interference" for him.

NATIONAL INDUSTRIAL ADVERTISERS ASSOCIATION, INC.

271 Madison Avenue, New York 16, N. Y.

An organization of over 4000 members engaged in the advertising and marketing of industrial products, with local chapters in ALBANY, BALTIMORE, BOSTON, BUFFALO, CHICAGO, CLEVELAND, COLUMBUS, DALLAS-FORT WORTH, DENVER, DETROIT, HAMILTON, ONT., HARTFORD, HOUSTON, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, MINNEAPOLIS-ST. PAUL, MONTREAL, QUE., NEWARK, NEW YORK, PHILADELPHIA, PITTSBURGH, PORTLAND, ROCHESTER, ROCKFORD, ST. LOUIS, SAN FRANCISCO, TORONTO, ONT., YOUNGSTOWN.

Advertising Index

Abrasive Machine Tool Co. 201
Abrasive Shot & Grit Co. 249
Acme Foundry Co. 186
Acme Resin Co. 93
Adams Co., The 46
Aeroquip Corporation 180
Airetool Manufacturing Co. 21
Airmatic Valve, Inc. 257
Ajax Electric Co. 235
Ajax Electrothermic Corporation 235
Ajax Engineering Corporation 235
Ajax Flexible Coupling Co., Inc. 36
Allied Chemical & Dye Corporation, Baker & Adamson General Chemical Division 257
Allied Chemical & Dye Corporation, Semet-Solvay Division 172
Allis-Chalmers Manufacturing Co., Buda Division 157
American Chain & Cable, American Chain Division 222
American Chain Division, American Chain & Cable 222
American MonoRail Co. 22
American Optical Co. 227
American Smelting & Refining Co., Federated Metals Division 152, 153
Ansco, A Division of General Aniline & Film Corporation 203
Archer, Daniels, Midland Co. 4, 5
Automotive Pattern Co. 204

Babcock & Wilcox Co., The, Refractories Division 101
Bailey, William M., Co. 163
Baker & Adamson, General Chemical Division, Allied Chemical & Dye Corporation 257
Baroid Division, National Lead Co. 98, 99
Bartlett, C. O., & Snow Co., The Back Cover
Bay State Abrasive Products Co. 18, 19
Beardsley & Piper, Division, Pettibone Mulliken Corporation 50, 175, 176
Behr-Manning Co., A Division of Norton Co. 191
Bell, M. A., Co. 226
Bellows Co., The 41
Berkshire Chemicals, Inc. 270
Bonnot Co., The 162
Branford Co., The 271
Buda Division, Allis-Chalmers Manufacturing Co. 157

Carman, Edwin S., Inc. 254
Carpenter Brothers, Inc. 168
Cast-Master, Inc. 181
Cedar Heights Clay Co. 85
Centrifugal Casting Machine Co. 253
Chisholm-Moore Hoist Division, Columbus-McKinnon Chain Corporation 170
Cincinnati Milling Machine Co., The 17
Cities Service Oil Co. 145
Clark Equipment Co., Construction Machinery Division 199
Clark Equipment Co., Industrial Truck Division 42, 43
Clearfield Machine Co. 223
Cleveland Chaplet & Manufacturing Co. 225
Cleveland Flux Co., The 154
Cleveland Metal Abrasive Co., The 228
Cleveland Tramrail Division, The Cleveland Crane & Engineering Co. 187
Cleveland Vibrator Co., The 220
Climax Molybdenum Co. 77
Columbia-Southern Chemical Corporation 255
Columbus-McKinnon Chain Corporation, Chisholm-Moore Hoist Division 170
Commercial Contracting Corporation 253

Daniels, C. R., Inc. 230
Dayton Pneumatic Tool Co. 258
DeBardeleben Coal Corporation 254
Delta Oil Products Co. 233
Demmler, William, & Brothers 83
Desmond-Stephan Manufacturing Co., The 177
Detroit Electric Furnace Division, Kuhlman Electric Co. 90, 91
Detroit Testing Machine Co. 204
Dings Magnetic Separator Co. 225
Dietert, Harry W., Co. 169
Dike-O-Seal, Inc. 200
Dodge Steel Co. 254
Du Pont, E. I., de Nemours & Co., Inc. 89
Durez Plastics Division, Hooker Electrochemical Co. 52

Eastern Clay Products Department, International Minerals & Chemicals Corporation 80, 81
Eastman Kodak Co., X-Ray Division 149
Electro Metallurgical Co. 213
Elwell-Parker Electric Co., The 240
Erie Strayer Co. 255

Fanner Manufacturing Co., The 74, 75
Federal Foundry Supply Co., The 2, 30, 31
Federated Metals Division of American Smelting & Refining Co. 152, 153
Foundry Educational Foundation 44
Foundry Equipment Co., The 26, 27
Foundry Services, Inc. 171
Fremont Flask Co., The 16
Fuller Co. 92

Gardner-Denver, Keller Tool Division 256
General Aniline & Film Corporation, Ansco Division 203
General Electric Co., Large Lamp Department 189
Gerlinger Carrier Division, Subsidiary, Towmotor Corporation 20
Globe Steel Abrasive Co., The 202
Goodrich, B. F., Industrial Products Co. 7
Great Lakes Carbon Corporation 151
Great Western Manufacturing Co. 275

FOUNDRY

BUSINESS STAFF

GEORGE A. POPE, *Business Manager*

MARY JANE KIMPEL, *Advertising Service Manager*

JEANNE R. FRANKLIN, *Staff Assistant*

Advertising

New York ..... J. F. AHRENS, J. L. OZANNE

Chicago ..... A. W. JOHANSEN, L. R. HETKE

Cleveland ..... A. L. KLINGEMAN, E. H. THOMAS

Griffin, Ga. ..... F. J. ALLEN

Los Angeles ..... F. J. FULLER

San Francisco ..... ROBERT W. WALKER CO.

London ..... JACK C. G. CRUMP, VINCENT DELPORT

DAVID C. KIEFER, *Marketing Director*

Market Research and Promotion

DAVID D. GIBBS, *Manager*

Foundry Census

MILDRED CHRISTOPHER, *Manager*

Circulation

BETTIE COOK, *Manager*

FLORENCE BELL, *Asst. Mgr.*

Classified Advertising

DOLORES BRANT, *Manager*

Production

A. V. ANDERSON, *Manager*

J. M. CASTIGLIONE

JEAN KELLER

JUNE SCHILENS, *Reprint Service*

Main Office

Penton Building, Cleveland 13, Ohio
Main 1-8260

Branch Office

New York, 17 ..... 60 East 42nd St. Murray Hill 2-2581

Chicago, 11 ..... 520 N. Michigan Ave. Whitehall 4-1234

Detroit, 35 ..... 15800 West McNichols Rd. Broadway 3-8150

Los Angeles, 36 ..... 5943 West Colgate Ave. Webster 1-6865

Pittsburgh, 19 ..... 2837 Koppers Building Atlantic 1-3211

San Francisco, 4 ..... 57 Post St. Sutter 1-5568

Washington, 4 ..... 1123 National Press Building Executive 3-6849

Griffin, Ga. ..... 1106 Pine Valley Road Griffin 7854

London ..... 2 Caxton St. Westminster, S.W. 1

Published monthly by

THE PENTON PUBLISHING COMPANY

G. O. HAYS ..... *President*
R. C. JAENKE ..... *Executive Vice President*
F. G. STEINEBACH ... *Vice Pres., and Secretary*
F. O. RICE ..... *Vice President*
J. P. LIPKA ... *Treasurer and Assistant Secretary*

Also publisher of STEEL • MACHINE DESIGN NEW EQUIPMENT DIGEST • AUTOMATION

Subscription: United States, possessions and Canada one year $5. Single copies $1. Other countries, one year, $20. Single copies $2.

Second class mail privileges authorized at Cleveland, Ohio. Copyright 1956 by THE PENTON PUBLISHING CO.

FOUNDRY *is indexed regularly by* Engineering Index Inc. 29 West 39th St., New York 18.

Member
Business Publications Audit Inc.
National Business Publications Inc.
Society of Business Magazine Editors
Industrial Advertising Research Institute

BPA NBP

Advertising Index

Hanna Furnace Corporation, The ... 95
Harbison-Walker Refractories Co. ... 11
Henning Brothers & Smith, Inc. ... 269
Hercules Powder Co. ... 160
Herman Pneumatic Machine Co. ... 86, 87
Hickman, Williams & Co. ... 148
Hinckley Industries, Inc. ... 258
Hines Flask Co., The ... 62, 63
Hooker Electrochemical Co., Durez Plastics Division ... 52
Hough, Frank G., Co., The ... 32
Hyster Co. ... 28

Illinois Testing Laboratories, Inc. ... 220
Imperial Belting Co. ... 10
Indiana Steel Products Co., The, Stearns Magnetic Products Division ... 12
Inductotherm Corporation ... 275
Ingersoll-Rand ... 192, 193
International Foundry Supply Co. ... 275
International Minerals & Chemicals Corporation, Eastern Clay Products Department ... 80, 81
International Molding Machine Co. ... 61
International Nickel Co., Inc., The ... 1, 259

Jeffrey Manufacturing Co. ... 40
Jenkins, W. L., Co., The ... 260
Jobbins, William F., Inc. ... 229
Jo-El Co. ... 256
Johns-Manville ... 221, 241
Johnston Manufacturing Co. ... 231
Joy Manufacturing Co. ... 58

Keller Tool Division, Gardner-Denver ... 256
Keokuk Electro-Metals Co. ... 54
Knight, Lester B., & Associates, Inc. ... 94
Kuhlman Electric Co., Detroit Electric Furnace Division ... 90, 91

Laclede-Christy Division, H. K. Porter Co., Inc. 217
Lectromelt Furnace Co. ... 71
LeTourneau, R. G., Inc. ... 271
Lindberg Engineering Co., Lindberg Fisher Division ... 245
Lindberg Fisher, A Division of Lindberg Engineering Co. ... 245
Link-Belt Co. ... 143
Liquid Carbonic Corporation, The ... 137
Lithium Corporation of America, Inc. ... 45
Logansport Machine Co., Inc. ... 237
Louthan Manufacturing Co. ... 60

Macklin Co. ... 183
Manhattan Rubber Division, Raybestos-Manhattan, Inc. ... 64
Manning, Maxwell & Moore, Inc. ... 55
Master Pneumatic Tool Co., Inc., The ... 257
Mayer, Carl, Corporation, The ... 194
Metal Blast, Inc. ... 37
Mid-West Abrasive Co. ... 76
Miller Electric Manufacturing Co., Inc. ... 224
Milwaukee Chaplet & Manufacturing Co. ... 208
Mitchell Industrial Tire Co., Inc. ... 270
Modern Equipment Co. ... 276
Mullite Refractories Co., The ... 249

National Engineering Co. ... 38, 39
National Lead Co., Baroid Division ... 98, 99
National Metal Abrasive Co. ... 24
Neff & Fry Co., The ... 246
Newaygo Engineering Co. ... 66
Newcomb-Detroit ... 271
Nicholls, William H., Co., Inc. ... 6
Nomad Equipment Division, Westover Corporation ... 246
North American Refractories Co. ... 230
Norton Co. ... 8, 9, 29, 88

Olin Mathieson Chemical Corporation ... Inside Front Cover
Oliver Machinery Co. ... 259
Osborn Manufacturing Co., The ... 164, 165

Pangborn Corporation ... 207
Pekay Machine & Engineering Co., Inc. ... 13
Penn Iron Works, Inc ... 259
Pickands Mather & Co. ... 219
Pittsburgh Coke & Chemical Co. ... 47
Pittsburgh Metals Purifying Co., Inc. ... 23
Porter, H. K., Co., Inc., Laclede-Christy Division ... 217
Precision Grinding Wheel Co. ... 205
Products Engineering Co. ... 168

Raybestos-Manhattan, Inc., Manhattan Rubber Division ... 64
Reda Pump Co. ... 250
Redford Iron & Equipment Co. ... 247
Reed, H. B., Corporation ... 253
Reichhold Chemicals, Inc. ... 185
Republic Coal & Coke Co. ... 250
Republic Steel Corporation ... 72, 73
Rice Pump & Machine Co. ... 256
Ross Operating Valve Co. ... 140, 141
Rotor Tool Co. ... 53
Royer Foundry & Machine Co. ... 239

Schrader's, A., Son, Division of Scovill Manufacturing Co., Inc. ... 243
Scientific Cast Products Corporation, The ... 238
Scovill Manufacturing Co., Inc., A. Schrader's Son Division ... 243
Semet-Solvay Division, Allied Chemical & Dye Corporation ... 172
Shell Process, Inc. ... 25
Shepard Niles Crane & Hoist Corporation ... 100
Sidley, R. W., Inc. ... 270
Simonds Abrasive Co. ... 48, 49
Simplicity Engineering Co. ... 56, 57
Sly, W. W., Manufacting Co., The ... 178
Smillie, C. M., & Co. ... 270
Smith Oil & Refining Co. ... 65
Smooth-On Manufacturing Co. ... 82
Spraying Systems Co. ... 255
Standard Conveyor Co. ... 14
Standard Electrical Tool Co., The ... 234
Standard Horse Nail Corporation ... 244
States Engineering Corporation ... 256
Stearns Magnetic Products, A Division of The Indiana Steel Products Co. ... 12
Sterling Grinding Wheel Co. ... 173
Sterling Wheelbarrow Co. ... 102, 172
Stevens, Frederic B., Inc. ... Inside Back Cover
Superior Pneumatic & Manufacturing, Inc. ... 254

Tabor Manufacturing Co., Division, Turbo Machine Co. ... 179
Tamms Industries, Inc. ... 244
Taylor, Charles, Sons Co., The ... 84
Taylor, S. G., Chain Co., Inc. ... 238
Thor Power Tool Co. ... 167
Timken Roller Bearing Co., The ... 51
Towmotor Corporation, Gerlinger Carrier Division ... 20
Turbo Machine Co., Tabor Manufacturing Co., Division ... 179

U. S. Graphite Co. ... 195
United States Rubber, Mechanical Goods Division ... 133
United States Steel Corporation, American Bridge Division ... 15
United States Steel Corporation, Subsidiaries ... 15
United States Steel Export Co. ... 15
Universal Clay Products Co. ... 258

Westover Corporation, Nomad Equipment Division ... 246
Wheelabrator Corporation ... 59, 159, 196
Whitehead Brothers Co. ... 35
Whiting Corporation ... 78, 79
Wiretex Manufacturing Co. ... 270
Woodward Iron Co. ... 135

Classified Advertising ... 261, 262, 263, 264, 265, 266, 267, 268, 269

Now . . .
INDUCTO
Controlled Melting Power Offers Higher Profit Margins

Maximum efficiency of the new INDUCTO control panel combines with the welded rigidity of the induction furnace to give you the most efficient and most economical metal melting equipment on the market today.

LOOK AT THESE IMPORTANT FEATURES:

- NEW FURNACE DESIGN . . . Rigid, welded construction increases lining life.
- NEW COMPACT CONTROL . . . Maximum efficiency in minimum space.
- WATER COOLED LEADS . . . Introduced through furnace trunion . . . area of least movement. Pits eliminated. Shorter leads offer minimum power losses.
- SELECTOR SWITCHES . . . Heavy-duty, water-cooled. Change furnaces in seconds. Mounted in lower part of control panel.
- LOWER INSTALLATION COST . . . No pits . . . less bus bar . . . ready-to-use control . . . you'll be in production immediately at far less cost.

Write today for Bulletin 60 giving complete details.

INDUCTOTHERM CORPORATION
412 Illinois Avenue • Delanco, N. J.

Circle 759 on Inquiry Card—Page 209

ANNOUNCEMENT

R. B. HARRISON, late with Universal Machinery & Equip. Co., Reading, Pa., is opening a new FOUNDRY SUPPLY & EQUIPMENT WAREHOUSE IN THE EAST. We will have unusual items to offer the FOUNDRY TRADE, among which are:

REVECON MELTING FURNACES. Use GAS or OIL. Operate at 60% EFFICIENCY. Cut melting time by half. USES NO CRUCIBLES. Will melt small quantities of iron economically.

MASLO EFFICIENCY MIXER. This mixer has been designed to latest ideas in sand mixers. Has two mullers 40" dia. Prompt delivery; priced to sell. Fully guaranteed.

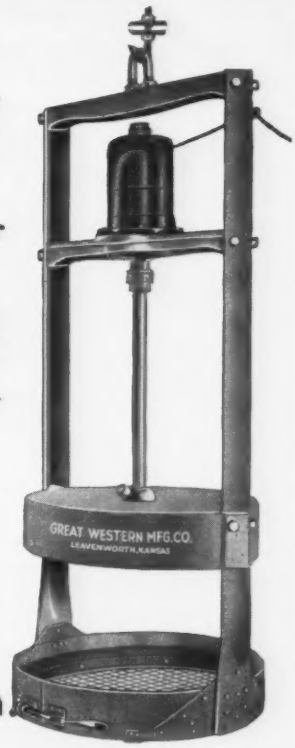
IMPORTED SUPPLIES AND FLUXES ON HAND AT ALL TIMES. Send us your inquiries. SERVICE BACKED WITH INTEGRITY.

INTERNATIONAL FOUNDRY SUPPLY CO.
Box 1053
Reading, Pa. Telephone 60794

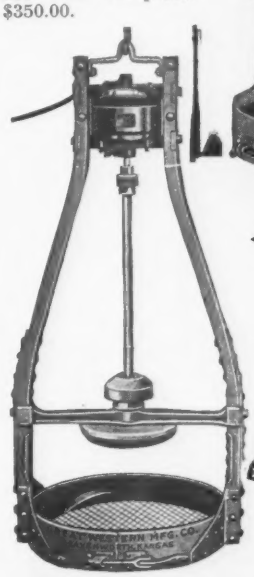
Circle 760 on Inquiry Card—Page 209

Don't Be Puzzled By "Riddles"

. . . The Answer Is Always COMBS!



TYPE "CR"
24" dia. round sieve. Thoroughly sifts, mixes, fluffs, aerates the sand. ⅓ H. P. enclosed motor. Height 4' 6", weight 250 lbs. Complete: $350.00.



TYPE "V"
Screens sand Fine, Coarse, Medium. 20" dia. sieve with special clamp for 5-second changes. Does work of 10 men. Fully-enclosed 1/6 h.p. motor 4' 6" high, weight 100 lbs. 20" Sieve: $275.00. Giant V-5, 36" Sieve: $495.00.

TYPE "CS"
24" square sieve. Continuous operation, no dumping. Refuse tails off to one side. Height 4' 10", weight 295 lbs. With ⅓ h.p. enclosed motor. Complete: $260.00.

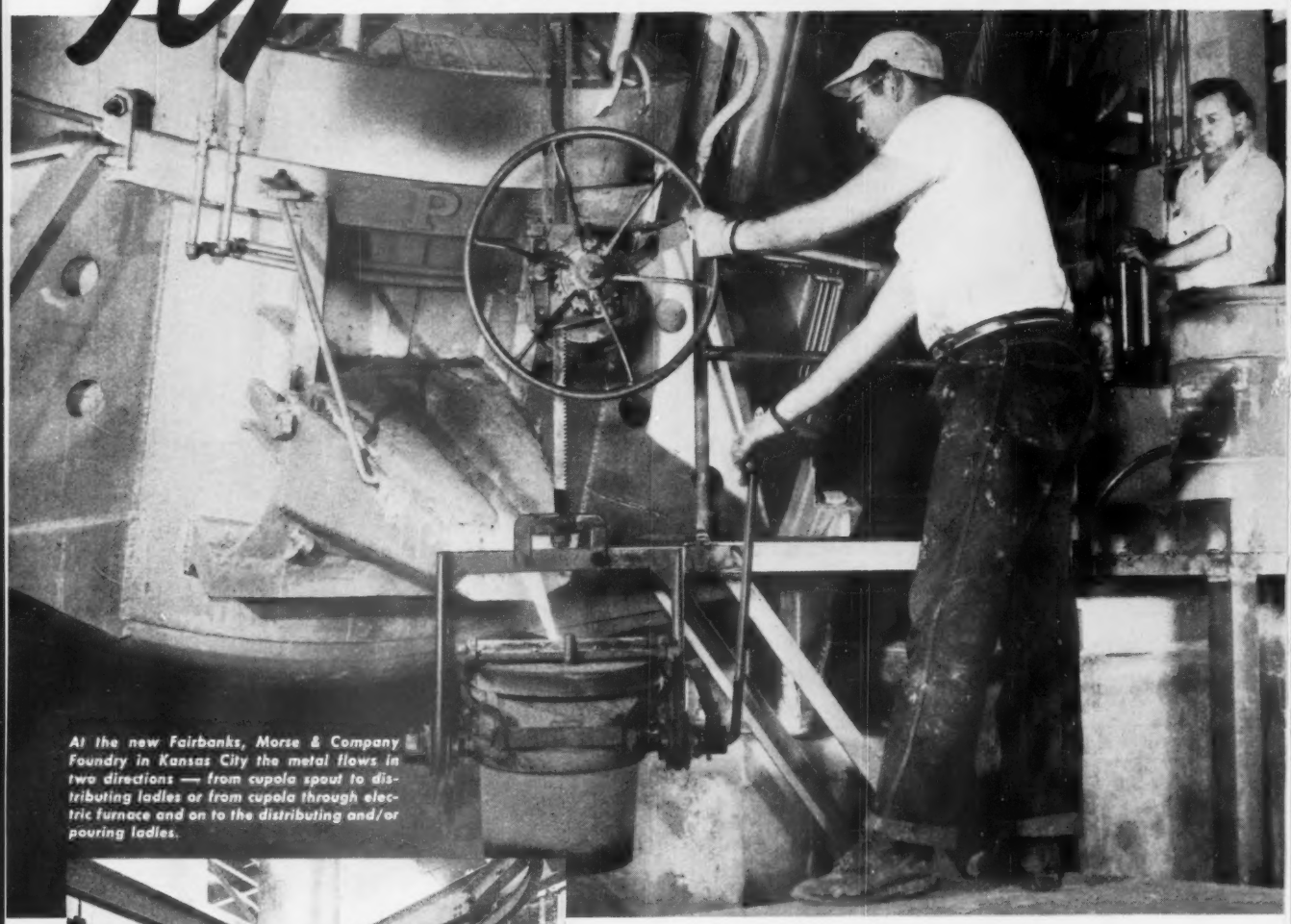
TYPE "HL"
Laboratory model . . . specially designed for sand control. Fitted with 1/6 H.P. motor. Price, complete less sieves: $250.00.

PROMPT DELIVERY from Your Foundry Supply House

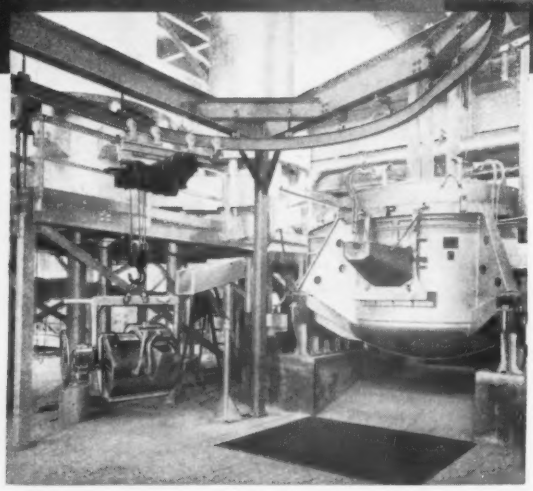
GREAT WESTERN MFG. CO.
Leavenworth • Kansas

Circle 761 on Inquiry Card—Page 209

Modernized...



At the new Fairbanks, Morse & Company Foundry in Kansas City the metal flows in two directions — from cupola spout to distributing ladles or from cupola through electric furnace and on to the distributing and/or pouring ladles.



FOR TOP EARNINGS!

POURING AND DISTRIBUTING SYSTEMS are just as productive as the engineering that goes into their over-all planning: Large castings, small castings, high tonnages, low tonnages, ferrous and non-ferrous all make a difference. "Showing-how" to cope with all these varying conditions is the extra value you gain when you plan with MODERN. Catching from the electric furnace, after duplexing, and moving the metal direct over monorail to mold is one of those different applications. Check-marking the catalogs you may require is a fast, easy way to learn more about your charging, melting and pouring problems . . .

FOUNDRY EQUIPMENT MEMBER FEMA MANUFACTURERS ASSOCIATION INC.

MODERN

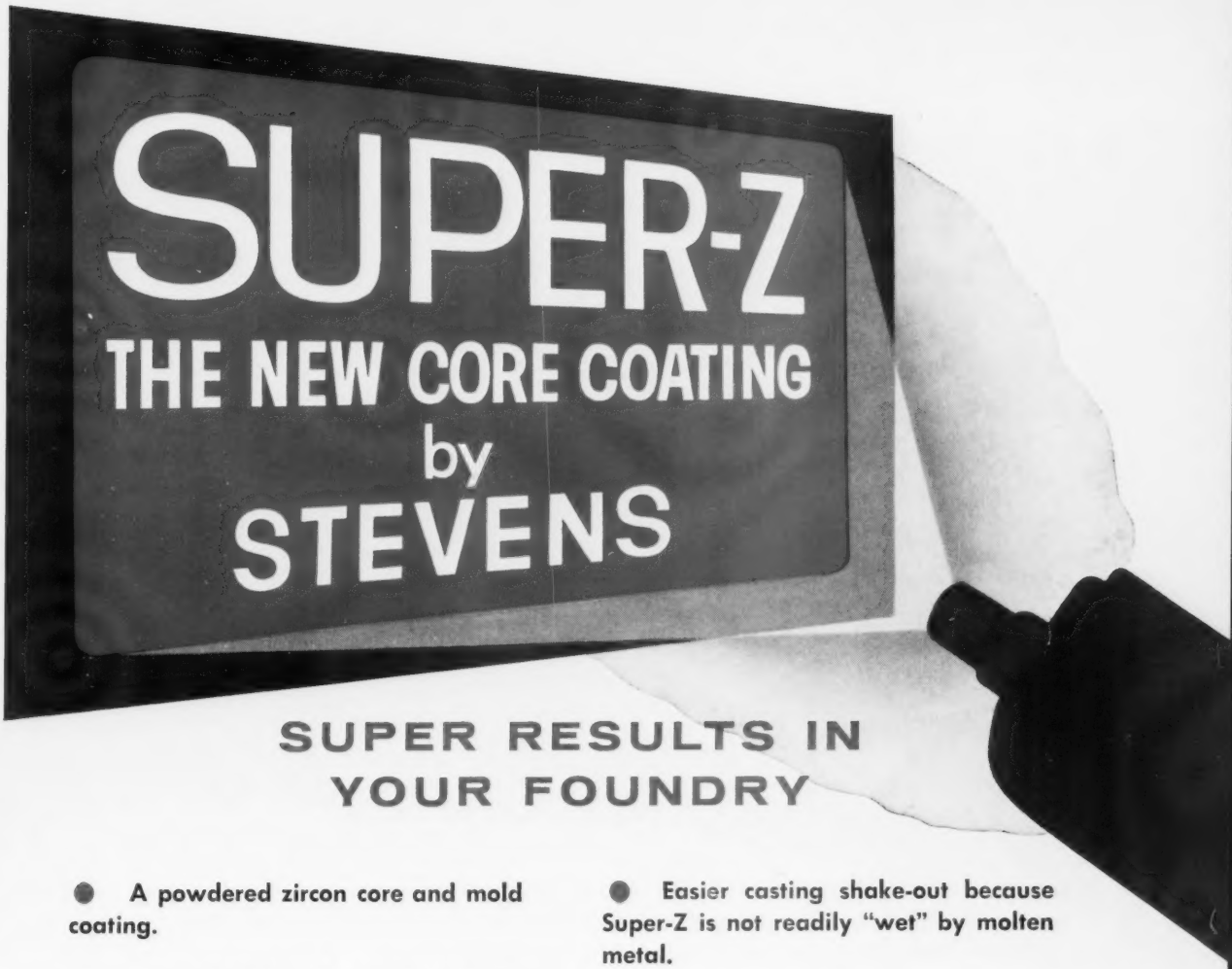
MODERN EQUIPMENT COMPANY
Dept. F-2, Port Washington, Wisconsin

Ladles and Pouring Devices, P-152-A ..... ☐
Cupolas, Chargers, Emission Control ..... ☐
Crane and Monorail Systems, 150 ..... ☐

Company .....
Street ..... Box .....
City ..... Zone ..... State .....
My Name .....

MODERN REPRESENTATIVES IN ALL PARTS OF THE WORLD

Circle 762 on Inquiry Card—Page 209



SUPER RESULTS IN YOUR FOUNDRY

- A powdered zircon core and mold coating.
- Has a fusion point of over 4000° Fahrenheit.
- Withstands the highest temperatures.
- Its white color means easy visual checking of coating thickness and ease in setting cores in molds.
- Easier casting shake-out because Super-Z is not readily "wet" by molten metal.
- Clean to use.
- 100% solids — you are not buying water.
- At normal consistencies it stays in suspension indefinitely.

For additional information write for Stevens Technical Bulletin FA-129 "Stevens Super-Z Coating," *Frederic B. Stevens, Inc., 1802-18th Street, Detroit 16, Mich.*

STEVENS 75 YEARS OF SERVICE

FREDERIC B. STEVENS INCORPORATED

EVERYTHING FOR A FOUNDRY

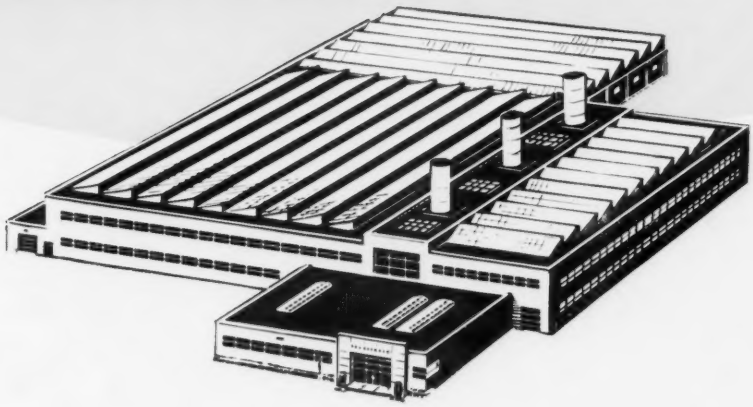
Circle 552 on Inquiry Card—Page 209

You too can have a better, more efficient, lower cost foundry

with

BARTLETT-SNOW

complete layout, designing, engineering, fabricating and erecting service



Tailor made to suit your kind and type of work, your production requirement and plant conditions, Bartlett-Snow foundry installations incorporate the most advanced techniques. Ample working areas, easy access to machines and proper coordination of equipment eliminate stock piling and re-handling between operations. All departments in the entire plant are synchronized into a smooth, efficient system, shortening the time — and reducing costs — from sand and metal receiving yard to shipping department. Let our experienced specialists help you on your next new plant, plant extension or modernization project.

THE C. O. BARTLETT & SNOW CO.

CLEVELAND 5, OHIO

NEW YORK • CHICAGO • DETROIT • BUFFALO • PHILADELPHIA